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THE SHIFT TO HIGHER AGE LEVELS IN AUSTRALIA AND THE UNITED STATES: ITS SOCIOLOGICAL AND MEDICAL INTEREST.

By C. V. CROCKETT,

Director of the Department of Medical Sociology and Research, New South Wales Branch, British Medical Association, Sydney.

A PRONOUNCED change in the distribution of population according to age levels is occurring in Australia. Concentration of persons in the higher age groups is increasing, and the rate of increase of these groups is nearly three times that of the population as a whole.

The same trend exists in Great Britain, the United States of America and other leading white nations. In the United States it has become a subject of research for various sociological agencies, and its social significance has had governmental recognition, first in certain "New Deal" legislation, and more recently in the establishment of a body known as the Unit on Gerontology. The Consultant of the Unit has commented: "The situation is wholly without precedent. Never before in the history of mankind has a like problem presented itself; there are no marked trails to follow."

In Australia the shift in age distributions has had by comparison little attention, yet is so considerable as probably to require new social and economic adaptations. Since it is in great degree a result of advances in preventive medicine and social hygiene, it is peculiarly a study for medical sociology.

In discussion of the shift to higher age levels perspective is given by the fact that throughout human history, until very recent times, population was relatively more concentrated in the ages from infancy to early maturity. The aging and the old constituted in number at least an unimportant group. In contrast with this immemorial distribution, the shift towards higher age levels may in Australia be illustrated as follows.

Of the Commonwealth's population of 7,174,247, persons aged forty years or over number 2,514,067. This is the percentage of 35·0. Persons aged forty-five years or over number 2,040,643, or 28·4%. (Figures are from preliminary estimates for June, 1942.)

In 1881, 17·64% of the male population and only 12·92% of the female population were aged forty-five years or over. This is in striking contrast with the percentage of 28·4 for the same group (both sexes) in 1942. (In the unequal distribution of the sexes in 1881 a factor doubtless was immigration during the previous two decades.)

The 1933 Commonwealth census showed that 25·04% of the male population and 25·12% of the female population were aged forty-five years or over. As the same age group was estimated (both sexes) at 28·4% at June, 1942, the percentage has increased by more than three within nine years.

The change in distribution by age groups can be illustrated in another way, as follows. In 1871 the percentage of population under the age of fifteen years was 42·09; by 1933 it had decreased to 27·48. In 1871 the percentage of the population aged sixty-five years or over was 1·74; by 1933 it had increased to 6·48.

In 1942 other distributions according to age were as follows:

50 years or over	1,588,821	(22·1%)
60 years or over	804,010	(11·2%)
65 years or over	530,318	(7·4%)
70 years or over	323,269	(4·5%)

Thus, in "young" Australia, more than every third person is aged forty years or over; more than every fourth person is aged forty-five years or over; more than every fifth person is aged fifty years or over; and every ninth person is aged over sixty years.

In the nine-year period up to 1942, the rate of increase of the group aged sixty years or over was nearly three times as great as that of the population as a whole.

A similar situation exists in Great Britain and in the United States. In Australia the shift to higher age levels is, however, in some respects even more pronounced than in the United States. The census of 1940 shows that in the latter country the percentage of persons over age forty-five years is 26·5, compared with 28·4% in Australia. It is estimated that by 1980 more than 40% of the United States population will be aged forty-five years or over, and every seventh person will be over sixty-five. A similar trend exists in Australia.

Incidentally, the number of persons over the age of sixty-five years in the United States is now nearly 9,000,000. Within the decade before 1940 there was a rise

of 36·5% among the elderly, contrasting with a rise of 7·2% in the whole population. Thus the group of the elderly is increasing five times as fast as the population as a whole.

In Great Britain the same shift to higher age levels is progressing. No census has been taken since 1931; but the shift in England and Wales between two census years is indicated as follows: in 1921 9,624,110 persons (25·4%) were aged forty-five years or over; in 1931 11,624,213 (29·0%) were aged forty-five years or over. The group comprising men aged over sixty-five years and women aged over sixty years was nearly 10% of the population of Great Britain in 1931. The Beveridge plan estimates that by 1971 this group will have increased to more than 20%.

Another basis of comparison is afforded by the median age (the age level above and below which there is the same number of persons). The median age of the Australian population has increased continuously between census years, as follows:

1881	20·08 years
1891	21·65 years
1901	22·53 years
1911	24·01 years
1921	25·84 years
1933	27·69 years

The median age of the United States population rose from 26·4 years in 1930 to 28·9 years in 1940—an increase of two and a half years within a decade. The nearest available figures for comparison of median ages are as follows: United States, 1930, 26·4 years; Australia, 1933, 27·69 years. It is estimated that if the age shift is not checked by other factors, at the present rate the median age of the United States population will have by 1990 risen to forty-four years.

The average expectation of life at birth is now, in Australia, 63·5 years for males and 67·1 for females. Half a century ago the corresponding figures were 47·2 and 50·8 years. In the United States the expectation of life at birth is over sixty-three years for white members of the population.

Advances in preventive medicine must be considered a main factor in the age shift. Another influence is the general improvement in nutrition. The average expectation of life at birth has been increased principally by the reduction, especially since the period of the first world war, of infant mortality. Towards the opposite end of the life span life expectancy has been increased, though in much less degree, by a number of important advances in the prevention or treatment of the diseases common in middle and later life. An example of this is the discovery of the insulin treatment for diabetes. Throughout the countries where insulin is easily available, its use, with or without other treatment, now enables millions of diabetic persons, who in earlier times would have died, to continue an active life. Diseases especially associated with aging include, besides diabetes, affections of the heart, arteries and kidneys, tuberculosis, cancer and arthritis.

Unless it is balanced by an equivalent rise in the birth rate, the age shift will be increased by the advances to be expected in geriatrics. This seems pertinent to the current discussion of what Australia's post-war immigration policy should be. It is often overlooked that young women are in one respect more valuable than men as immigrants. It would be logical, if financial aid should be given to intending migrants, to give it mainly to young, spouseless women, in numbers proportionate to Australia's excess marriageable males. For such women, being in general potential mothers, would later produce offspring that would be additional to the normal increase of the population. The unmarried male immigrant, on the other hand, if he produces offspring, does so in the average case by marriage with a woman who could have had her children by marriage with an Australian. In the Commonwealth's population the excess of males over females is about 43,000. In Great Britain the excess of females over males is almost 2,000,000, and of these nearly half a million are in the age group fifteen to thirty-five years, and so are of prospective reproductive age.

To assist the Unit on Gerontology there has been formed a National Advisory Committee on Gerontology, representative of the scientific thought of the United States. The Unit aims at becoming a clearing house for the great number of present and projected investigations into gerontology in that country. In a recent survey the Unit records nearly 300 separate studies having a direct or an indirect bearing on the subject. The main fields covered are: the biology of aging as a process in the human and other species; the diseases associated with aging; and the socio-economic problems of the age shift.

"Age" and "aging" should not be confused; aging is a normal biological process, and varying views are taken of the time of individual life at which it begins. Some organs, such as the thymus gland, "age" more rapidly than others. Some tissues have a long-sustained capacity for renewal, and some seem to have a potential life span greater than that of the body as a whole. The Consultant (in charge of investigations) of the Unit on Gerontology (Dr. Edward J. Stieglitz)[1] has made the following comments:

> There is a common misconception that senescence implies decline alone. This erroneous assumption has greatly retarded the development of the science of gerontology and has engendered a fatalistic inertia even among scientists. With aging certain capacities and attributes become enhanced; many of these increments are compensatory to depreciations in other capacities. For example, diminution of physical strength and speed of reaction are often largely counterbalanced by increased skill and judgment. Adaptation may be slowed, but sense of responsibility is enhanced. Wisdom is conditioned by experience, which, in turn, is a factor of time, or age. Admittedly, aging does not create critical judgment. However, time fosters its growth when intelligence exists in youth and cultivation is continued. It is because of trained judgment, special knowledge and experience that the leaders carrying the gravest responsibilities in all walks of life are older men. The potentialities of development of the older mind by continued cultivation are as yet almost wholly unappreciated.

It can be assumed that as public interest is directed to the subject, the various sociological aspects of the "aging" of the community will be intensively studied in Australia. One probable result will be a stimulation of research in geriatrics, and also in industrial medicine, since industry will need to find room for an increasing proportion of older workers. Amongst the public generally there is need of better education of adults in the elements of prevention and control of the chronic and disabling diseases of later life.

The shift to higher age levels must modify perspectives in social thought no less than in medicine. Progress in gerontology, or the study of aging, and in geriatrics, or the study of the diseases associated with age, is of special interest to Australia, for here it is much to the national advantage that as high a proportion as possible of a small population shall be kept in productive activity. Already, and particularly in the United States, a recasting of views has begun on the physical and mental capacities of the large and increasing section which is past the meridian of life. Should society be content with improving facilities for care of the aged—and there is much to be done in this direction—or should it also interest itself in better utilizing the capacities of the aging? Both are questions for social medicine. It has been customary to under-estimate the physical and mental capacities of the elderly and of the aged. Ordinarily, individuals of the aging group aim at finding means of retiring as early as possible from an active life. But this outlook may be influenced by two factors: first, until recent times medical science could give comparatively little help in maintaining efficiency against the disabilities of aging; and secondly, there is the strong influence of suggestion from social convention. The needs of war industry, in particular, have led to a modification of this traditional outlook. As Stieglitz has observed: "There are vast, though largely unappreciated and unutilised potentialities in the elderly." And he speaks of "the immense, unutilised reservoir of constructive effort resident in the millions of elderly persons". Here it should be noted that "potentialities"

implies that working capacities undergo certain changes along with aging.

There was until modern times little variation in the traditional view of what constitutes "age". Early in the last century Byron wrote, at thirty-six, a poem deploring the fact (?) that he was growing old ("My days are in the yellow leaf"). But as well, Balzac was being ridiculed for what seemed to most of his contemporaries a revolutionary idea—which was that a woman thirty years old might be an object of romantic interest. Thirty had been regarded practically as middle age for women. Nowadays the "woman of thirty", as Balzac called her, in the average case is rightly considered to be still only in the prime of life.

For many minds the economic will seem to be the most important aspect of the shift to higher age levels. In the United States, as in the Soviet Union, old-age retirement allowances (not to be confused with old-age pensions for the needy) already are assured to many millions of citizens. "Within less than a decade, old-age security has become one of the major issues before this country."[3] Recognition of the social significance of the age shift, and of the pronounced rise in the average age of employees, has left no substance in the once dominant theory of the "age deadline" (which might be forty, or even thirty years) above which workers must be discarded in the interest of industrial efficiency.

The Social Security Act (1935), the basis of the United States "New Deal" scheme of social legislation, includes ten separate programmes. Of these only one, the system of old-age insurance, has been created and is administered entirely by the Federal Government. In the nine others, including the provision of old-age pensions for the needy, the Federal Government assists the social security schemes of the States. The principle adopted in the programme of "Old-Age and Survivors Insurance" is thus defined by the Social Security Board, which administers the programme: benefits on retirement, at sixty-five years or after, "are payable as a matter of right irrespective of individual need, and in relation to past earnings".

Among Australians generally there seems to be little knowledge of the American achievement in dealing with an economic problem that has been intensified by the shift to higher age levels. It may therefore be useful to take a short glance at the principle adopted in the "Old-Age and Survivors Insurance" programme. The benefits are considerable, ranging up to the maximum of $85 a month for a retired worker and his dependants. It was recognized that without a system of contributions during the earning life the community could not afford such benefits, unless an intolerable taxation burden were to be laid on the younger age groups. The Social Security Board stated in a report to the President and Congress that it was "convinced that a system of old-age security which attempted to operate on any other principles would be bound to lead to disaster both for the beneficiaries and for the general taxpayer". Accordingly a trust fund in the Federal Treasury is provided by means of a "payroll" tax, based on the employee's average monthly wage. When the earnings for the year exceed 3,000 dollars, the amount above that limit is excluded from the calculation. The tax, at present 1%, payable by both employer and employee, rises gradually to 3% in 1949.

In its first scope the programme covered all wage-earners employed in industry or commerce since December 31, 1936; but certain other classes of persons qualified in various ways, so that by the end of 1942 over 63,000,000 persons aged fourteen years or over, of both sexes, had obtained an "account number" under the scheme. In February, 1943, the number of persons receiving retirement benefit was 724,000. In the following example, the average monthly wage of the retired worker has been $150. After three years' coverage, he receives on retirement at sixty-five years or after a monthly benefit, for life, of $30.90; after ten years' coverage, $33.00; after twenty years' coverage, $36.00. Supplementary benefits are mainly as follows: for the wife at sixty-five years or after, and for each unmarried dependent child aged under sixteen years (or under eighteen years if regularly attending school), one-half of the insured's benefit. A widow, aged sixty-five years or over, or any widow with dependent children, is entitled to three-fourths of the insured worker's benefit, with one-half of the insured's benefit for each dependent child aged under eighteen years. The maximum amount payable, $85 a month for the insured and dependants, corresponds to an average monthly wage of $250.

Needy aged persons not covered by "Old-Age and Survivors Insurance" are eligible, under a separate Federal-State programme, for old-age pensions, which, as in Australia, are non-contributory, being in principle a small allowance for alleviation of poverty. (The Commonwealth pays in old-age pensions about £15,000,000 a year.)

In Australia, as in the United States, the burden of supporting the increasing section of the elderly and the old will probably be partly relieved by a progressive lengthening of the average period of working life. But in any case, as this section realizes its increasing numbers (and therefore its voting strength), the less prosperous of its members will be unlikely to be content with existence merely on the old-age pension. It is stated that data available from operations under the American social security programme "completely dispel the long-standing belief that from their earnings most workers can lay aside enough to protect themselves against old-age dependency".[3] The sudden descent from earnings of not less than the living wage to a meagre old-age pension, at the time of life when hardship is least easily borne, seems to be incompatible with the ideal of "freedom from want", one of the "four freedoms" of the Atlantic Charter to which Australia has subscribed.

Discussing socio-medical aspects of the age shift, the Consultant of the Unit on Gerontology makes the following observations:[4]

> The situation is without precedent. In the past, conspicuous shifts in population structure have arisen as results of destructive forces such as wars, famines and pestilence, but always the changes were in the direction of relative increase in youth. The less fit failed to survive. Today we are faced with the enhanced survival of less vigorous youths because of the protection of medical science and the lessened rigors of modern civilisation. The apparent boon of increased longevity may become a curse. Longevity without health is more than individual or personal tragedy. In the aggregate it becomes a dangerous economic burden upon the nation. The social burden of chronic physical and mental illness among senescents is already immense. It is steadily increasing. We can ill afford additional loads now. Contrariwise, however, longevity with health, prolonged usefulness and productivity can be made into an incalculably valuable asset, for there exists in the elderly an immense, largely unutilised and little appreciated reservoir of accomplishment. Upon the balance sheet of our human resources chronic illness with long and progressive disability and the failure of society to employ many functionally capable among the elderly must be recorded as liabilities. Offsetting these are the potential assets of wisdom, judgment, accumulated skills and the desire to serve characteristic of later maturity. These are available, if health is maintained.

What is the philosophical or spiritual significance of the fact that the nation is aging? Stieglitz ventures the suggestion that "the future holds promise of profound change. A period of intellectual conquest may be dawning. Man at last lives long enough to have time to think".

Capacities largely or wholly obstructive of social progress may not, as is commonly believed, be more characteristic of age than of youth. For example, in the direct destruction of life, the most eminent war-makers—Alexander, Hannibal, Jenghis Khan, Napoleon, Hitler—have been celebrated for achievement in youth or early maturity. By contrast, Pasteur, whose discoveries have saved even more lives than the conquerors have destroyed, was in his sixty-fourth year when he first successfully immunized a human being against an infectious disease (hydrophobia). It was the elderly Socrates who "corrupted" youth with new ideas; and an age deadline of forty years would have suppressed many of the most effective contributors to freedom and progress,

from Nelson at Trafalgar to Columbus opening the new hemisphere.

Much of the world's finest creative work in literature, art and science has been done by persons not only past the meridian but near or past the "allotted span" of life. It is possibly significant that during periods abnormally creative in these fields many of the leading personalities have been notable for the age they attained as well as for their achievement. Among such periods are the Periclean and later generations of Greece, the Renaissance, and the nineteenth century in western Europe. All are characterized by genius which remained productive even into what is considered extreme old age. In the flowering period of Greece, the three great dramatic poets all lived to be old (and for that early time, attained abnormal age). Euripides died at seventy-five years, Æschylus at sixty-nine and Sophocles at ninety-one (he wrote *Œdipus Tyrannus* at ninety). Hippocrates lived to ninety-five (or, according to another tradition, to one hundred and four). Plato died at eighty. Among the giants of the Renaissance were Michelangelo, who died at eighty-nine, and (in the great succession of Venetian painters) Giovanni Bellini (died at eighty-six), Tintoretto (died at seventy-six) and Titian (died at ninety-nine). At ninety-four Titian was painting the last of his masterpieces. He succumbed five years later to the plague, which, however, also carried off one-half of the citizens of Venice, old and young.

The nineteenth century abounds in long-lived Europeans of genius or high talent. Random examples are: Darwin (died at seventy-three), Faraday (died at seventy-six), Pasteur (died at seventy-three), Crookes (died at eighty-seven), Kelvin (died at eighty-three), Tolstoi (died at eighty-two). The rival leaders in poetry, Browning and Tennyson, died at seventy-seven and eighty-three; the rivals in statesmanship, Disraeli and Gladstone, at seventy-seven and eighty-nine. Florence Nightingale lived to be ninety, and continued her work for health reform until late in life. Verdi, after producing much work of less distinction in his "prime", composed his best works, *Otello* and *Falstaff*, at the ages of seventy-four and eighty years respectively. After eighty (he died at eighty-eight) his genius was still fecund, but he composed no more operas, for the reason that he was no longer equal to the labour of writing the vast number of notes in a full musical score.

Sporadic examples of intellectual vigour maintained into old age occur in other periods. Benjamin Franklin was "one of the most talked about men in the world" at seventy; he became sole plenipotentiary to the French Court at seventy-two, a commissioner for the peace with Britain at seventy-five, chief executive officer of the State of Pennsylvania at seventy-nine, and he lived to be eighty-four. Newton illustrates the value of good personal hygiene, for at birth he was so small and weak that, as his mother related, he "could have been put in a quart pot". But he became one of the greatest figures of science, and lived to be eighty-five.

All these are, however, exceptional individuals, flourishing without benefit of geriatrics, which is concerned rather with the average man and woman. The last great advance in preventive medicine has been the reduction, within the past few decades, of infant mortality. With the suggestion that the next objective should be to increase the average length of life, not all would agree. Gerontologists are careful to distinguish between the "life span", a biological limit, and average length of life. In man, the life span seems to be about one hundred years. The average length of life varies greatly—for example, it differs between peaceful, literate communities and warlike, non-literate groups. It is assumed that, since man is learning to control his environment, by coordination of social and individual effort the average length of life could be increased to about seventy-five years. Extension of the periods of youth and maturity would be desirable; but merely to increase the average length of life might be to lengthen nothing but old age.

The age shift will surely stimulate educational reform in the direction of a higher average of mental cultivation. For our educational policies are, essentially, still those which were evolved when the average length of life was much less than it is now. Half a century ago, in Australia, in the average case the child leaving school at the age of fifteen years had a further thirty-four years of life (dying at forty-nine). Nowadays the child still leaves school at about the same age, but he has a further fifty years of life (dying at sixty-five). Sixteen years have been added to the span. Largely it will be education that will decide whether those sixteen years are to be made tolerable by a range of interests or to be devoted miserably to "killing time". The few who study and think throughout life have always continued their education for their particular needs. But average people, who now have sixteen more years of life, need education which will encourage them to keep their minds agile by continuous exercise.

Since the shift to higher age levels is progressing, it is for geriatrics to strive to prevent or control the chronic and incapacitating diseases of middle and later life. Aging, though in the physiological sense its rate of progress varies widely among individuals, is always a part of living. To live is to age, even in "young" Australia, where already every third person has passed the meridian line of forty.

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TEMPERATURE IN SHOCK.

I. Local Effects.

By J. Devine,
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At the present time it is convenient to classify shock under one of the three following headings: (i) primary (occurring immediately, and being probably neurogenic in origin), (ii) secondary (occurring some hours after the initiating trauma, most of the symptoms being produced by loss of plasma and blood locally, in the region of the traumatized area), and (iii) crush syndrome (occurring after some days, resulting from long-continued crushing injuries, and being associated with pathological changes in the kidneys and other organs).

In this paper secondary shock only is considered in regard to the local plasma loss from the circulation, and thermal considerations in its local treatment are discussed.

Secondary shock is accompanied by hæmoconcentration, as was shown by Sherrington and Monkton Cope as far back as 1893[1]; they produced experimental shock in dogs by tying off portion of the mesentery, and observed the increase in specific gravity of the blood that resulted. Since then the degree of hæmoconcentration has been taken as a criterion of the severity of shock, and has been evaluated by the hæmoglobinometer and the hæmatocrit.

In turn, the hæmoconcentration has been shown to be due to loss of plasma from the circulating blood to the tissues in the neighbourhood of the traumatized region. Parsons and Phemister in 1930 found that trauma to the hind leg of a dog produced a fall in blood pressure accompanied by a corresponding increase in volume of the traumatized limb.[2] In 1931, Blalock showed that in dogs burnt on one side of their body an increase in weight of the burnt side up to 3·34% of the total weight occurred when one-third of the total body area was burnt.[3] In the same year Beard and Blalock showed that the composition of the fluid that escaped from the blood stream in burns and after traumata was identical with plasma.[4] Dunphy and Keeley, in 1941, experimentally confirmed the local loss of fluid from the circulation at the site of injury[5]; Underhill, Kapsinow and Fisk[6] found that in man 70% of the plasma was lost from the circulation in twenty-four hours after one-sixth of the body area had been burnt.

It seems reasonable to regard many of the signs and symptoms of secondary shock as being due to plasma loss and hæmoconcentration, though many and varied are the theories put forward as to the primary cause of this loss. Blalock found in animal experiments that if 4% of the body weight of plasma was removed while the blood corpuscles were reinjected, the blood pressure could be kept below a pressure of 70 millimetres of mercury.[3] Cullen, Schecter, Freeman and Laws, in 1942, found that loss of blood volume leading to shock could be produced without reduction of the circulation, and thought that it was evident from their data that sufficient quantities of blood and plasma were lost into the traumatized areas to explain the incidence of shock without the postulation of other theories.[7] Blalock also reported, in 1931, that loss of fluid in the traumatized area was the chief if not the whole reason of fall of blood pressure after light trauma.[8] However, Andrus stated that slowing of the blood flow preceded fall of blood pressure and anoxia.[9] Best and Solandt, in 1942, reported that fluid loss was the main but not the only factor in fatal shock.[10] It is obvious that the rate of transference of plasma to the tissues must depend, amongst other things, on the permeability of the capillary wall and the rate of flow of blood in the capillary circulation. Heat causes an increase in capillary flow, an increase in the capillary permeability and also an increase in tissue metabolism. Considering these facts, one would expect that the application of cold to areas of tissue damage would lessen plasma loss and tend to prevent the development of shock.

Local Application of Cold.

It was my impression that among the casualties to the hospital at Tobruk, those who had been for some hours in the sea, in the cold of the Mediterranean winter, arrived at hospital in good general condition, even though they had extensive burns and wounds, and that they appeared to be in better condition than those whose came from the surrounding land areas. Their shock came on after they had been for a few hours in hospital, and after they had been warmed. These men had all been chilled generally as well as locally, and no accurate records were kept; but the present investigation is the result of the interest stimulated.

Allen, in 1939, reported that prolonged ligation of extremities of animals could be performed if the extremity was chilled, and that the extremity so treated became anæsthetic after a time. He advised this as a method of anæsthesia in emergencies, since only ice and a tourniquet were needed and shock was minimal.[11] Blalock, in 1942, induced shock in animals under barbiturate anæsthesia by blows on an extremity, and found that the survival time of animals whose injured extremity had been warmed was half of those whose extremity had been cooled, though there was no decrease in the local loss of fluid to the tissues.[12] Allen, in 1942, found that the whole of the intestines of a dog could be kept for several hours outside the abdomen if they were chilled and ligated.[13] Brooks and Duncan, in 1941, showed that cold prevented the onset of wound sepsis and also slowed down wound exudation and disintegration of devitalized tissues, and they recommended its use in surgical shock.[14] McElvenny, in 1941, reported a case of traumatic amputation of both knees, in which the patient's desperate condition improved after local refrigeration.[15] Pickerill, in 1942, advised local refrigeration and simultaneously general heating of burnt patients.[16] However, the dangers of local refrigeration have also been stressed by many authors. Muirhead and Hill, in 1942, report that a severe freezing of the hind leg of a dog followed by a thaw is a reliable method of producing shock, and state that shock following freezing and thawing has been shown to be due to loss of protein-containing fluid into the tissues at the site of thawing.[17]

Experimental Investigation.

An attempt was made to determine whether the local application of a moderate degree of cold would decrease the local loss of plasma following shock-producing trauma.

Nine dogs were employed; they were first anæsthetized with chloroform. "Dial" was then injected intraperitoneally as a light basal anæsthetic, the administration being repeated in small amounts intraperitoneally whenever necessary. The first dog was given the anæsthetic and a tracing of the carotid pressure was kept over several hours; it was found to be unaffected by the anæsthetic. One of the other dogs used died while anæsthesia was being induced with chloroform, and yet another as it was being subjected to trauma.

Once the dog was quietly under the basal anæsthetic a hind limb was shaved and then a tourniquet was applied, and twenty blows with a mallet weighing 32 ounces were directed to the leg below the tourniquet. The leg was then placed, tourniquet still in position, in a water bath at 50° C. for twenty minutes. This whole procedure had been found to produce shock when the tourniquet was released. When the tourniquet was released, the water was kept at 50° C. in the case of three of the dogs, and in that of the other three it was kept at about 8° C. Extremes of temperature were used in order to emphasize the differences to be observed, though of course a normal limb exhibits swelling when warmed. The carotid blood pressure was continuously recorded, and every ten minutes the limb volume was recorded by a method based on a reversal of Archimedes's principle.[18] The limb was immersed in a water bath up to a mark on the skin made by a fine suture, and was held in position by a retort stand. The limb being fixed, the water bath was counterbalanced on a set of scales sensitive to 0·25 gramme when fully loaded with counterbalancing weight and bath. When the limb increased in volume it displaced more water, and the weight of water displaced was measured by the addition of weights to the counterbalance side until the mark on the leg was again just on the surface. It is considered that with the sensitivity of the balance at 0·25 gramme, the reading was accurate to 1·0 gramme. When the temperature of the water bath around the limb was kept at 50° C., the displaced water would weigh less than the same volume of cold water, and this would tend slightly to minimize the increase in limb volume observed. Within the limits of accuracy required for this experiment, 1·0 gramme of water was assumed to have a volume of 1·0 cubic centimetre, and all results are expressed in cubic centimetres (Figure I). The rectal temperature (kept as constant as possible by heating and cooling the body of the animal) and the water bath temperature were also recorded every ten minutes. The weight of the dog and the air temperature at the time of the experiment were noted.

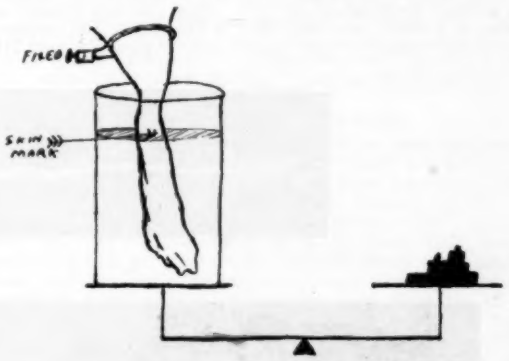


FIGURE I.
Plan of method of measuring limb volume.

The results are summarized in Table I.

TABLE I.

Dog Number.	Weight. (Pounds.)	Volume of Leg Used. (Cubic Centimetres.)	Average Temperature of Water Bath.	Range of Rectal Temperature.	Percentage Increase in Leg Volume.	Comments.
II	13	140	55° C.	1° C.	14·0	Dead at 75 minutes.
III	22	140	8° C.	1° C.	4·0	Well at 140 minutes.
IV	14	130	52° C.	1° C.	19·0	Dead at 30 minutes.
VI	16	150	10° C.	1° C.	8·0	Well at 100 minutes.
VII	19	150	49° C.	1° C.	18·0	Well at 120 minutes.
VIII	15	140	7° C.	2·5° C.	3·0	Well at 130 minutes.

If the average of these results is taken, it may be stated as follows: (i) when the average temperature of the hot water bath was 52° C., the percentage increase in limb volume was 17 and two of the dogs were dead in 100 minutes; (ii) when the average temperature of the cold water bath was 8° C., the percentage increase in limb volume was 5, and no dog was dead in 100 minutes.

FIGURE II.

FIGURE III.

FIGURE II.

Hind leg of dog whose leg has been warmed following trauma. Note obvious swelling.

FIGURE III.

Hind legs of dog whose limb was cooled after trauma.

It will be noted from the foregoing results that the local increase in limb volume of those limbs kept at an average temperature of 52° C. was over three times that of limbs kept at an average temperature of 8° C. Only one dog whose leg was kept in a warm bath was alive at the end of 100 minutes following the release of the tourniquet. Figures II and III show the hind limbs of Dogs VII and VIII after they had been killed, and indicate the visible difference in the amount of swelling between those limbs kept warm and those kept cold. Figure IV is a typical carotid blood pressure tracing taken from dogs whose limbs had been kept cold and warm respectively. Figure VI is a graph to show the increase in limb volumes of Dogs IV and VIII, one being kept in the hot water bath, one in the cold bath.

Discussion.

It is physiologically reasonable to assume that less swelling should follow trauma in a limb that is kept cool than in a limb which is warmed. The experiments reported here show a significant difference in the limb volumes under these conditions, as the increase in volume of the warmed limb was over three times that of the cooled limb. The fact that two out of three dogs whose limbs were warmed after trauma were dead within two hours of this trauma is of interest; but in view of the fickleness of the duration of life of a dog, both under anæsthesia and with a canula in its carotid artery, it is not considered significant.

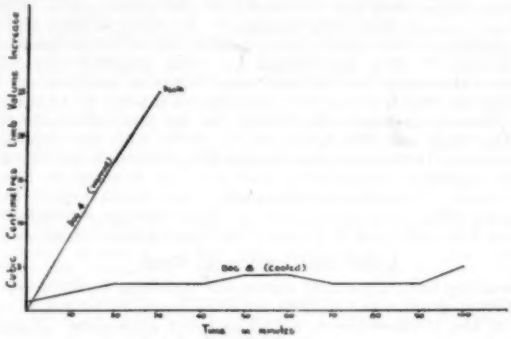
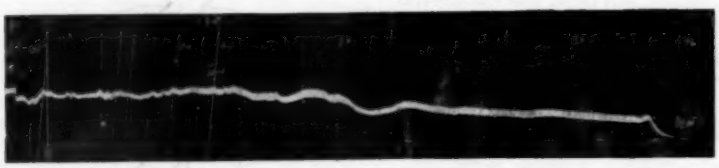


FIGURE V.

Increase in limb volume when limb is kept in a warm bath (Dog IV, 133 cubic centimetres of leg used) and in a cold bath (Dog VIII, 140 cubic centimetres of leg used).

There is as yet no unanimity of opinion as to the cause of shock, and in this article it is not the intention to enter into such a discussion; but it is generally agreed that a result of secondary shock is loss of circulating fluid from the circulation into the neighbourhood of the trauma. This being so, our present treatment of shock aims, among other things, at replacing the fluid thus lost by blood, plasma, serum or saline solutions. The logical clinical application of the experimental work here recorded is that, firstly, heat should not be applied in the neighbourhood of injuries that are likely to cause shock, for if this is done local loss of circulating fluid to the tissues will be increased. Secondly, cooling of a traumatized limb may be effective in lessening the local loss of fluid from the circulation, and may thus, in the light of experimental work published by others, be helpful in modifying the onset of shock.



A

B

FIGURE IV.

Typical carotid blood pressure recordings: *A*, from dog whose traumatized limb was kept in a warm bath; *B*, from one whose limb was cooled.

Conclusion.

A significant difference in the increase in volume of limbs in warm and cold baths following trauma is recorded. The clinical application of this finding is discussed.

Acknowledgements.

This work was carried out in the pathology department of the University of Melbourne. I wish to express my thanks to Professor P. MacCallum and Professor R. D. Wright for much active help and advice and for the making available of facilities, and to Miss Andrew, of the Gordon Craig Memorial Library, for help with the literature.

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ISOLATION OF PLEUROPNEUMONIA-LIKE ORGANISMS FROM THE MALE URETHRA.

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IN recent years interest has awakened in the group of organisms usually referred to as pleuropneumonia-like or "L" organisms. The filtrable organism which is the cause of contagious pleuropneumonia of cattle was first cultured in a cell-free medium in 1898. In 1923 a similar type of organism was described as the cause of contagious agalactia of sheep. Since 1937 several organisms of this group have been isolated from mice and rats. These were mostly incriminated as causing arthritis or pneumonia, while one caused choreiform nervous symptoms. Sabin[1] has ably reviewed the work in this field up to 1941.

The characteristics of this group are as follows: (i) They do not stain with simple bacteriological stains, but can be demonstrated by prolonged staining with Giemsa. (ii) They do not grow in ordinary media, but grow rather feebly in rich media containing 10% to 40% of serum, and produce a characteristic type of colony on surface cultures. (iii) They are very pleomorphic, varying in form from minute "elementary bodies" and spherules to "asterodiscules" and branching filaments. (iv) They are filtrable through gradocol membranes down to about 0·4μ in average pore diameter, but with considerable reduction in numbers.

In 1940 Dienes[2] isolated pleuropneumonia-like organisms from the cervix of five women, most of whom were suffering from gonorrhœa. In 1942 Dienes and Smith[3] reported having isolated this type of organism from 23 of 77 cervical swabs and from one of eight vaginal swabs from women, and from three of 36 prostatic secretions and one of eight urethral discharges from men.

Willis[4] stated in 1942 that in his experience with Australian soldiers 60% of cases of urethritis were non-gonococcal. About the same time Gibson[5] estimated that 45% of cases were non-gonococcal. Willis stated that in about half the cases of non-gonococcal urethritis no bacteria were seen in smears. In most of these cases the symptoms are trivial and would usually receive no attention in civilian life.

In view of Dienes's recent findings and of the fact that examination of smears from the discharges frequently reveals no bacteria, it seemed a likely possibility that pleuropneumonia-like organisms were the cause of this condition in the soldiers.

Arrangements were made with army authorities for an investigation to be carried out on non-gonococcal urethritis at this laboratory. Squadron-Leader K. McLean kindly selected the patients and arranged for the men to come here. The patients were examined usually two or three days after they had reported for treatment. The discharge was usually trivial, but in a few instances it was frankly purulent and in one it was quite copious. There was either no pain on urination or only slight scalding. Nearly all the men gave a history of casual sexual intercourse five days to four weeks previously.

Examination of smears revealed no gonococci. Nearly always fairly numerous pus cells and some epithelial cells were found. Frequently no bacteria were seen in smears, but sometimes Gram-positive cocci or diphtheroids were found.

Isolation of "L" Organisms.

The anterior portion of the urethra was washed out with about five millilitres of serum "V.F." broth, described below. The material obtained was then cultivated in one or more of the following ways: (*a*) several loopfuls were sown on the surface of 30% horse serum "V.F." agar, pH 8·0; (*b*) the same method as in (*a*) was used, but 250 milligrammes *per centum* of sulphanilamide were added to the medium; (*c*) the material was filtered through a gradocol membrane of an average pore diameter of 0·8μ, and the filtrate was sown on a plate as (*a*), or into a fluid medium or semi-solid shake cultures; (*d*) the filtrate was sown in serial dilution in shake cultures in semi-solid medium. No isolations were effected in the fluid medium; each of the other methods was about equally successful. The use of semi-solid shake cultures was probably the most sensitive method, but was introduced only toward the end of this series of tests.

"L" organisms were isolated from four cases out of 24. Not all of these men, however, were entirely suitable patients; for instance, a few had received irrigation treatment a few hours before the specimen was collected. In three cases the "L" organisms were about as numerous, or slightly more so, than the bacteria; in the fourth they were less numerous. The bacteria which grew in culture were mostly diphtheroids and *Staphylococcus albus*.

Description of the "L" Organisms.

Morphology.

The morphological appearance of the "L" organisms was that characteristic of the group. Occasional young cultures of one of the strains in semi-solid serum agar showed under dark-ground examination the rich polymorphism described

by Turner[6] for the organism of bovine pleuropneumonia, including slender branching filaments, strings of minute cocci, spherules, asterodiscules and elementary bodies (or "conidioides"). The more usual morphological findings were the presence of spherules and elementary bodies only. These were the only forms seen with three strains, but only a few preparations of these were examined. In very thick smears stained by Gram, carbol fuchsin diluted to 1:3 being used as the counter-stain, a few small coccoid elements were seen. These smears closely resembled smears of Nelson's "coccobacilliform bodies".[7]

Cultural Characteristics.

We used Turner's[6] "V.F." medium with the addition of 30% horse serum, the pH being adjusted to 8·0. "V.F." media are made from a peptic digest of ox muscle and liver; this digest was kindly supplied to us by Dr. Turner. For plate culture agar (2% or 2·5% strength) was put up in amounts of twelve millilitres, and six millilitres of serum were added before the material was poured, thick plates being an advantage. The plates were either placed, closed, in the incubator for four to six hours before being sown, to allow partial drying, and then were sealed with adhesive tape, or alternatively, they were sown without being dried and not sealed until next morning. Human serum gave slightly better growth than horse serum. Klieneberger[9] and others recommend the making of sub-cultures on plate cultures by cutting out a piece of the medium and smearing this across a fresh plate. We found this unnecessary except with old cultures, and obtained good subcultures by the usual technique with a platinum loop. Plates incubated in an anaerobic atmosphere gave better growth than those incubated aerobically. The addition of 10% liver extract, as used in Dr. A. W. Turner's laboratory,[1] slightly improved growth. However, surface growth on plates, aerobically and without the addition of liver extract, took place readily on primary culture.

The colonies were typical of the group, in that a sharply demarcated central area was visible when the colony was viewed under the microscope by transmitted light. Under favourable conditions colonies attained a diameter of up to 0·2 millimetre in forty-eight hours and occasionally as much as 0·4 millimetre in four days; but usually colonies were much smaller. The surface of the colonies viewed by reflected light was usually evenly convex, but occasionally umbilicated; it was never seen to have a central nipple, as has been described with most other "L" organisms.

One strain which had been cultured for several months grew moderately well on ordinary nutrient blood agar; two other strains gave no growth on this medium.

Shake cultures in semi-solid serum "V.F." agar were found to give far the best growth. Even in primary isolation cultures, the colonies attained a diameter of as much as three millimetres in five days, exceeding in size staphylococcal colonies. In 0·5% agar the colonies have a central opaque spot surrounded by a circular semi-opaque zone with hazy edges. In 0·4% agar the opaque spot is eccentrically placed near the upper margin of the semi-opaque zone. In 0·3% agar the opaque spot is outside and above the semi-opaque zone, which hangs under it like an inverted balloon. In a two-day culture the opaque spot may be 0·1 to 0·15 millimetre in diameter, and the whole colonies are up to 1·0 millimetre in size in 0·3% or 0·4% agar. After two days' incubation the colonies are visible only in the anaerobic zone, but they later appear also in the aerobic zone.

Fluid cultures could not be established from primary filtrates or plate cultures, even when a large piece of a vigorously growing culture was used as seed. Fluid cultures were established in 30% horse serum "V.F." broth by heavy inoculation with luxuriantly growing semi-solid culture, and by the growing of the primary ones in an anaerobic jar.

In fluid medium one strain grew with an even turbidity and no deposit. By bacterial standards the turbidity was very faint; but if the culture was held up to the light and shaken, a swirling effect could be observed. Another strain formed a fine deposit on the lower side of a slightly inclined tube or on the bottom; this deposit, when disturbed, gave a slightly floccular suspension. Another strain formed a fine deposit which, when disturbed, formed an even, fine turbidity.

Sulphanilamide added to the medium in plate cultures in amounts of 200 milligrammes *per centum* is not inhibitory to these organisms; but amounts of 250 and 300 milligrammes *per centum* have a slight inhibitory effect on them.

Gentian violet added to semi-solid shake cultures did not inhibit one strain at a dilution of 1 in 200,000; but it did inhibit two other strains at a dilution of 1 in 200,000, and it slightly inhibited them at a dilution of 1 in 400,000.

Agglutination.

Antigen was prepared from fluid cultures of one strain by centrifugation and resuspension of the deposit in formalin-phosphate buffer solution at pH 7·2. Coarse particles were separated out by light centrifugation, or by standing for two days in the refrigerator, and the supernatant fluid made a satisfactory antigen for agglutination tests. The serum of a rabbit, which had received four intravenous inoculations of the same strain grown on human serum agar plates, gave complete agglutination only to 1 in 16. The test was carried out at 45° C. for three hours.

Animal Inoculation.

Two strains were inoculated intraperitoneally into mice. In the livers of mice killed ten days after inoculation with one of the strains petechiæ were found. The organisms were recovered from these livers in culture. The remaining mice survived. Mice inoculated in the foot pad developed no lesions.

Two cynomolgus monkeys were inoculated by the introduction of culture into the urethra without trauma. No visible lesions or discharge developed.

Discussion.

Although most of the known "L" organisms are pathogenic, non-pathogenic ones have been isolated from sewage (Laidlaw and Elford[10]), from decomposing leaves, soil and manure (Seiffert[11]), and from lesions of foot-rot in sheep (Beveridge[12]). However, Laidlaw and Elford could not detect them in fæces, and I have likewise found none in two specimens of normal human fæces. During recent years several workers including Sabin[1] have made an extensive search for "L" organisms in human throats without finding any. I have also made cultures from a number of throats in cases of upper respiratory infections and pharyngitis without finding any "L" organisms. This background would lead one to regard an "L" organism isolated from an infective process in man with suspicion as to its possible pathogenic role.

These experiences have obviously been insufficient to establish the significance of the "L" organisms found in four of the 24 cases of non-gonococcal urethritis. There are three possible interpretations: (i) that the organisms are saprophytes of no pathological significance whatever; (ii) that they are directly responsible for the urethritis, producing a specific disease; (iii) that the organisms are normally saprophytes of the female genitalia, but under certain conditions of virulence or dosage they can set up a urethritis in the male when transferred by sexual contact.

The available data seem to fit the third postulate better than either of the others. The fact that the strains differed slighly in cultural characters and growth requirements speaks against a homogeneous specific pathogen.

Until a more extensive series has been studied, by means of the sensitive method of isolation in semi-solid agar, one cannot with any certainty ascribe even this minor role to the "L" organisms. However, the isolation of such organisms from man is as yet sufficiently unusual to be of some interest, and the method of cultivation in semi-solid shake cultures seems worth reporting.

[1] Fresh sheep liver is minced, and three times the amount by weight of normal saline solution added. This is heated to 80° C. for fifteen minutes, then filtered through paper and a Seitz pad.

Summary.

Pleuropneumonia-like organisms have been isolated in four out of 24 cases of non-gonococcal urethritis in men. The organisms grew luxuriantly in semi-solid agar "V.F." serum medium.

Acknowledgements.

I wish to acknowledge with thanks the helpful advice and interest of Dr. F. M. Burnet and Dr. A. W. Turner. Dr. Burnet suggested and arranged for the investigation. Squadron-Leader K. McLean selected the cases and made the necessary clinical arrangements.

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Reports of Cases.

TWO EXAMPLES OF LIPOID PNEUMONIA.

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RECENTLY two examples of lipoid pneumonia have come under notice in Adelaide, one in an adult who died from volvulus of the sigmoid colon and showed incidentally some reddish, firm patches in the lower lobe of the right lung, and the other in an infant, whose right lung appeared consolidated and firm, owing, it was thought at the time, to an organized pneumonic exudate. In the infant, the lipoid pneumonia appeared to be the cause of death. Unfortunately in both cases the lungs were not kept, the whole of the tissue preserved being used for the making of paraffin blocks. Consequently it is only an inference that the large vacuoles found distending the macrophages in the alveoli of the lungs had been occupied by an oily substance during life. The size of the vacuoles, however, leaves little room for doubt as to this; but the natures of the oily substances are not clear. In the man, the substance may have been paraffin oil, which had been given to him as an aperient nearly a year previously, though some vegetable cells seen in a bronchiole show that on some occasion he had inhaled food which might have contained fat globules. In the infant, no history was available of the use of oily nasal drops or other likely source of oil globules. Since the infant had always been blue round the mouth and eyes and had failed to gain in weight, it is possible that some fatty substance may have been inhaled with amniotic fluid at the time of birth.

The appearances presented microscopically are striking. The bland oil globules evidently gain entrance actually into the alveolar spaces. Here they become engulfed by the macrophages, which become more and more distended. Finally these cells tend to merge with each other to form a foam-like structure filling the alveolar space and probably impossible of dislodgement from it. This foreign material seems to be very slightly irritating, though the alveolar walls and septa were thickened in the man, and in the baby a number of leucocytes were also present in places. In the man, some of the smaller vacuolated cells were possibly in the alveolar wall, having made their way back from the alveolar space into the framework of the lung, though of this I could not be certain.

Ikeda[1] describes an infantile and an adult type of lipoid pneumonia. In the latter, secondary changes of fibrosis and so on occur in the parenchyma of the lung. The lesion in the infant under discussion conforms exactly to his infantile type, and the lesion in the man could probably be called an early example of the adult type from the moderate thickening of the alveolar walls. In the present cases I have not seen the large crescentic giant cells lining the alveolar wall that Ikeda describes.

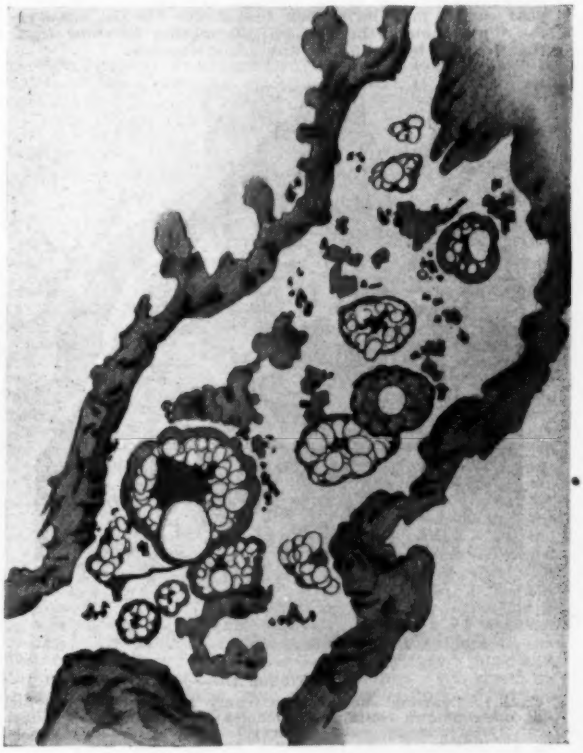

FIGURE I.

Case 1: Drawing of the periphery of the lesion showing macrophages distended with large vacuoles. (Drawn by F. Millward Grey.)

Case 1.

On September 12, 1941, a man, P.S., aged seventy-four years, was admitted to the Royal Adelaide Hospital from the Mental Hospital at Northfield; he was suffering from intestinal obstruction, due to a volvulus of the sigmoid colon,

which was dilated to a diameter of two or three inches. He died next day. At the post-mortem examination some reddish, firm patches were noted in the lower lobe of the right lung. Their appearance suggested that organization of a pneumonic exudate might have taken place. A piece of the tissue was put aside for paraffin sections and the rest was discarded. When the sections were prepared it was found that the condition was an example of lipoid pneumonia. In alveoli round the edge of the lesion the macrophage cells were somewhat distended with two or three vacuoles in which, presumably, some oily substance had been enclosed and had dissolved out in the preparation of the sections. In the denser areas these macrophage cells had become greatly distended by these vacuoles and had fused together, forming large sheets of vacuolated material occupying the lumen of alveoli and infundibula. Examination of some of the macrophages revealed the presence of two or three nuclei, indicating a tendency to the formation of giant cells. Incidentally it may be mentioned that in one case that recently came under my notice tuberculous giant cells were present in the lumen of alveoli, quite evidently derived from the macrophages so frequent in the alveolar spaces.

Though there was no means of proving that the vacuoles had been occupied by an oily substance, as no material had been preserved in formalin, nevertheless there seems little doubt that this is an example of lipoid pneumonia.

Inquiries were made from the Mental Hospital. It appears that the patient had had an illness in October, 1940, when he had had paraffin as an aperient; but his throat had never been sprayed with oily mixtures. He was the subject of epileptiform seizures. On September 10, three days before he died, he had been given a teaspoonful of liquid paraffin, but showed no indication of any respiratory distress, and in any case the lesions in the lung seemed older than of three days' duration. It seems possible that the paraffin given a year earlier may have been responsible for the changes in the lung, though there is no information to show that at the time he had suffered any inconvenience.

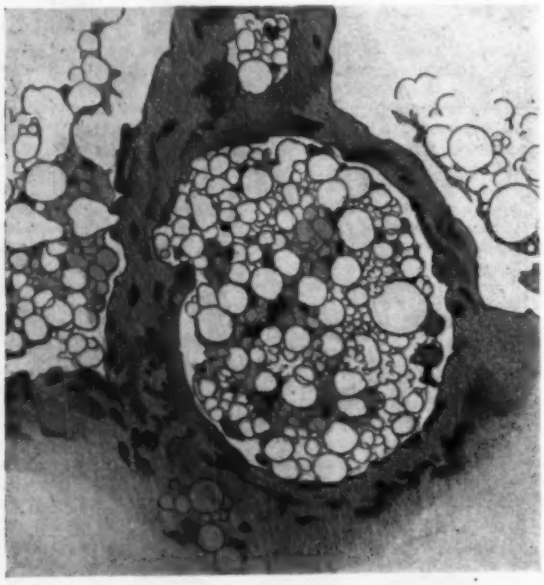

FIGURE II.

Case I: Drawing showing the foamy appearance from fusion of macrophages containing vacuoles. (Drawn by F. Millward Grey.)

Case II.

Baby M.B.K., aged four and a half months, died at Mareeba Babies' Hospital on May 10, 1942. She had been born on December 20, 1941, and weighed six pounds eight ounces at birth. Her history was that she had failed to gain weight properly since birth and had always been blue round the mouth and eyes. Every two or three weeks since her birth she had become quite ill and pale, and the blueness had become more pronounced. She often vomited and was very drowsy, and the chest was often "mucusy". On her admission to Mareeba Babies' Hospital, it was found that she had gained only twenty ounces since birth. Coarse sounds were audible at the bases of both lungs. An X-ray examination revealed a partial spontaneous pneumothorax on the right side. No history could be obtained of the use of nasal oil drops for this infant.

The autopsy revealed no subcutaneous fat. The lungs were speckled with purple patches. Most of the right lung seemed consolidated and firm, as if from partial organization of a pneumonic exudate, and in colour it was partly red and partly pale. There was also some firmness in the base of the left lung. A large thymus was present and a "floating" caecum and ascending and transverse colon were found. Two portions of lung were selected for microscopic sections. Examination of these sections disclosed that many of the alveoli contained much vacuolated and sometimes enormously swollen macrophages. These had in places united to form a foamy-looking structure through which the nuclei of the cells were scattered, and in other places the vacuolated cells were welded together by exudate. Some alveoli also contained red cells, and polymorphonuclear cells were present in places. In the atria and bronchioles there was in addition some red-staining material of indefinite nature; this suggested that at one time, perhaps at birth, some foreign substances had been inhaled.

FIGURE III.

Case II: Drawing showing the foamy appearance from fusion of macrophages containing vacuoles. (Drawn by F. Millward Grey.)

Summary.

1. Two cases of lipoid pneumonia are recorded, one in an adult, the other in an infant. The nature and the source of the oily substance could not be ascertained in either case.

2. The oily substances had been ingested by the macrophages. Vacuolated macrophages later tended to unite to form a foamy structure filling the alveoli. This was probably difficult or impossible to dislodge and so led to some respiratory embarrassment. There seemed to be little reaction to the presence of the oil globules and their enclosing cells.

3. Occasionally, macrophages had united to form typical foreign body giant cells. In a previous case of tuberculosis, tuberculous giant cells had been seen in the alveolar space. Foreign body and tuberculous giant cells thus can clearly be derived from such macrophages.

Acknowledgement.

I am much indebted to Dr. Constance Finlayson for notes on Case II, and also for the opportunity of performing the autopsy.

Reference.

(1) K. Ikeda: "Lipoid Pneumonia of the Adult Type (Paraffinoma of the Lung)", *Archives of Pathology*, Volume XXIII, 1937, page 470.

EMBOLUS OF LEFT FEMORAL ARTERY DUE TO A HYDATID CYST.

By CHARLES WESLEY,
Sydney.

Clinical Record.

J.S., aged six years, was admitted to the Royal Alexandra Hospital for Children on January 9, 1942. His mother said that during the day he appeared quite well, and had been playing on a slippery dip for most of the morning. At about 4 p.m. he jumped from the table to the floor, screamed, and said that something had come into his throat. He complained of severe pain across his forehead, and was very white and frightened and afraid of being left alone. He was nauseated, but did not vomit. He lost the use of his left leg, which became as yellow as a sovereign from the knee to the foot; it was cold to the touch and remained so, and he complained to his mother that he had no feeling in it. At 6 p.m. he complained of pain behind the left knee.

In the past the child had suffered from mumps and measles. The mother said that he had never been a really healthy child. He had always been peevish, irritable and easily fatigued, but had always had a good appetite.

On examination, the lad was seen to be a healthy, normal-sized child for his age. He did not appear to be in pain. His temperature was 98·4° F., his pulse rate was 116 per minute and the respirations numbered 22 per minute. The left leg was pale from the toes to the mid-point of the leg, and this area was completely anæsthetic. Tenderness and swelling of the left popliteal fossa were present. No pulsation could be detected in either the *dorsalis pedis* or the posterior tibial artery, and only indefinite pulsation was felt over the femoral artery in the femoral triangle. The lad could move the leg freely when asked to do so. An examination of the other systems revealed no abnormality. A provisional diagnosis of embolus of the popliteal or femoral artery was made.

Operation was performed at 1 a.m. on January 10, 1942, nine hours after the onset of the symptoms under ether anæsthesia induced by the open method. An incision was made over the swelling in the left popliteal fossa. The popliteal artery was found to be in a state of intense spasm. An incision was made in the artery, but neither blood nor embolus was revealed. The opening was sutured with fine silk, and the wound was closed. An incision was next made over the femoral artery in Scarpa's triangle. A further incision was made in the artery just above its junction with the *profunda femoris*; translucent membrane immediately appeared through the opening, and was observed to extend both proximally and distally in the opening. The proximal portion was gradually pushed out with each pulsation of the artery, and the portion in the distal segment of the artery was easily removed with forceps. The artery was sutured with fine silk and the incision was closed. The membrane was about three inches long and cystic in nature; it appeared to be a hydatid cyst.

Pulsation did not return in the posterior tibial or *dorsalis pedis* artery; patchy gangrene developed, involving half the foot, the lower half of the leg anteriorly, and a square patch over the calf posteriorly; the gangrene was dry in nature. The wound in the popliteal fossa showed no sign of healing; the general health of the child was good. Amputation through the thigh at the junction of the middle and lower third was performed on February 14, 1942, five weeks after the original operation.

The specimen was examined by Dr. Reye, pathologist to the Royal Alexandra Hospital for Children, and later by Professor Harold Dew and Professor R. K. Inglis, of the University of Sydney, and it was found to be a hydatid cyst.

When the mother was further questioned, she stated that the child was a thumb sucker, and had been accustomed for the last three years to play with a dog that belonged to the people next door. He had never been out of the city except for a period of two weeks in 1939, when he was at a convalescent home in the country with his mother.

On January 29 and 30, 1942, radiological examination disclosed no evidence of hydatid or other lesions in the chest and no abnormality in the liver. On July 19, 1943, no abnormality was radiologically apparent in the chest. On January 10 and 20, 1942, the Casoni test failed to produce a reaction, and on February 4 and July 19, 1943, the test produced positive reactions. On January 20, 1942, March 20, 1942, and July 19, 1943, the complement fixation test produced an incomplete positive reaction. On January 20, 1942, 2% of the leucocytes were eosinophile cells, on February 20, 1942, the percentage was 7·0, and on July 19, 1943, the percentage was 5·0.

Comment.

This case is reported because of its rarity. An investigation of the literature has revealed no similar case. The Casoni test did not produce a positive reaction until February 4, 1942, nearly four weeks after operation. The complement fixation test produced an incomplete positive reaction on January 20, 1942. Both Casoni and complement fixation tests produced positive reactions on July 19, 1943, eighteen months after operation. Professor Dew, of the Department of Surgery of the University of Sydney, saw the patient in consultation on February 3, 1942. He considers that the cyst was growing from the wall of the left ventricle, that it became detached, and that it entered the aorta, lodging at the junction of the femoral and *profunda femoris* arteries. In adults the common carotid artery is proportionately much larger than in children, so in the case of adults, in any intracardiac rupture of a cyst, the tendency is for it to enter the common carotid artery and so pass to the brain. In the case reported scolices have probably been spilt through the circulatory system. The prognosis is thus bad, because secondary cysts will probably appear in brain, lungs, liver and other organs within a period of five years. For prognosis the complement fixation test will be the best guide. The Casoni test will continue to produce a positive reaction after the large dose of antigen.

Acknowledgements.

I wish to thank Professor H. R. Dew and Professor W. K. Inglis, of the University of Sydney, for their help in this case.

Reviews.

"THE HAPPY WARRIOR."

IN his rectorial address at St. Andrews University on May 3, 1922, J. M. Barrie took courage as his theme. He spoke as one of an older to those of a younger generation, bidding them face the future with stout hearts and with high purpose, taking over from age the reins of government and the fashioning of the future. He referred to those who had given their lives in the conflict then barely ended and said that the war had taken spring out of the year. "The spring of the year lies buried in the fields of France and elsewhere." Speaking of Scott and his comrades in the Antarctic, he asked: "What is beauty?" And made reply: "It is these hard-bitten men singing courage to you from their tent. . . ." Of courage itself he spoke as "a proof of our immortality, greater even than gardens 'where the eve is cool'". It was courage of this kind that possessed Patrick Hore-Ruthven, whose poems have been published under the title "The Happy Warrior".[1]

Patrick Hore-Ruthven was captain in the Rifle Brigade and saw fighting in the Western Desert. He acted for a while as liaison officer to the small detachment of Frenchmen fighting in the Middle East and also as liaison officer to the Seventh Australian Division for General Sir Henry Maitland Wilson, who writes a foreword to the volume. "His thoughts were always for his men, who would follow him anywhere. He had in his make-up a something that harked back to the ancient days of chivalry and that showed itself frequently even in a war in which all the developments of the twentieth century were present." Patrick Hore-Ruthven's mother, Lady Gowrie, writes a preface. Lady Gowrie tells us that the author's young wife, his father and she herself wish to share the poems with thousands of wives and parents who grieve, because in them is found the word of promise that "guides the unquenchable spirit of man".

[1] "The Happy Warrior", by Patrick Hore-Ruthven; 1943. Sydney: Angus and Robertson Limited. 8½" x 5½", with one illustration. Price: 4s. 6d.

Patrick Hore-Ruthven had courage:

"Come, join the deathless priesthood of our band,
Renouncing all the dear things that you know;
Forgo the peaceful tilling of your land,
Leave sheep unshorn
Unbyred the kine,
Unweaned the calves
Untrained the vine,
Unhampered by the wheel the mill-race flow;
And in these ranks come proudly take your stand,
For to the laughing gods the young men go.

. . . . . .

"From fields and towns and villages we come,
Desert our loves for this new chastity,

. . . . . .

"For this we were ordained. Love's beauties lie
Along strange ways that we at last shall roam.
True to our laughing gods we young men die."

He had love for France:

" . . . France that is:
Fear-sullied relic of a heritage
Which yet survives in their unconquered hearts."

And he had faith in her future:

"Will not the land which rallied to a maid
Respond again to this same quality
Triumphantly in that avenging hour
When lilies of an older chivalry
Charge to redeem a fallen Tricolour?"

In "Syria" he writes of the "quick red wine which men call war". And in this land

"I cannot hold the beauty of these hills,
Nor hold clouds' puckering shadows to my heart.

. . . . . .

"I drew deep joy from savage winds' caress
The mockery of shadows unattained
And mountains daring me their maidenhood."

Of a friend killed in a commando raid, he writes:

"On his wrist,
On his wrist,
With a hawk upon his wrist
As the dawn was breaking clearly,
A gentleman rode early,
With a hawk, a hooded hawk
Upon his wrist.

. . . . . .

"Oh he died,
Yes, he died,
As other brave men died,
But for valiant quenched vitality
Deeds spring to immortality:
A young man lingers lightly
Where he dies."

Could J. M. Barrie read the poems of Patrick Hore-Ruthven, he would surely ask us as he asked the students at St. Andrews in 1922, whether we have learned and are learning wisely from what befell those who have given their lives in battle. If these men had the courage to fight and die, we who remain must strive for what Francis Thompson called "a will accipitrine to pursue", that we may in some measure be worthy of them and make a contribution to the healing of the nations.

THE MEDICAL ANNUAL.

"THE MEDICAL ANNUAL" for 1943 has arrived in Australia, and it is, as ever, most welcome.[1] The task of producing such a volume in England during the war cannot be easy, and the publishers are to be congratulated on the unbroken sequence, and also on the fact that the standard of past years has been maintained. One sentence in the "Publishers' Note" is important. It is stated that "the publishers have been fortunate in enlisting the co-operation of the Ministry of Supply in allocating the necessary supplies of paper". That the Ministry of Supply is seized with the value of such a publication is gratifying.

This year's volume is a little larger than last year's, approximately forty more pages being devoted to a review of the year's work. The sulphonamides are among the subjects to which a good deal of space is given; about ninety references appear to them in the index. It is shown that even sulphadiazine which is held to combine efficiency with safety in a more satisfactory way than any of the other sulphonamides, is likely to produce ill effects; several deaths have been reported after its use. Succinylsulphathiazole is regarded as a most promising drug for use in certain intestinal conditions. An article on the chemotherapy of bacterial invasion, based on no less than 113 references and covering eleven pages, deserves particular attention. Hormonal treatment is reviewed, attention being paid to amenorrhœa and the use of sex hormones in the treatment of male castrates and eunuchs. An interesting review is contributed by W. E. Lloyd on mass radiography of the chest with reference to pulmonary tuberculosis. Much of the discussion is based on the special report on the subject issued by the Medical Research Council in 1942. In view of the difficulty of the production of lenses, the only practicable method in Great Britain is use of the thirty-five millimetre cine film. The Ministry of Health had arranged for thirty units for mass radiology of the chest to be available by 1943. Among the subjects to which special attention has been paid are spontaneous hypoglycæmia, gastric and duodenal ulcer and dyspepsia in the services, nutrition in war, ante-partum hæmorrhage, and the labyrinth and Ménière's disease. War surgery naturally is granted much space; burns and their treatment and the plastic surgery of burnt hands and fingers are fully discussed. Many aspects of general and special surgery are covered and some well-produced illustrations help the text materially.

To do more than indicate generally the type of matter in this volume is impossible. "The Medical Annual" is so well known that this should not be necessary. Our perennial advice to medical practitioners to keep this book on their shelves cannot be varied. The work has become almost part of the normal equipment of the practitioner.

[1] "The Medical Annual: A Year Book of Treatment and Practitioner's Index", edited by Sir Henry Tidy, K.B.E., M.A., M.D. (Oxon.), F.R.C.P., and A. Rendle Short, M.D., B.S., B.Sc., F.R.C.S.; 1943. Bristol: John Wright and Sons Limited. 8¾" × 5½", pp. 567, with illustrations. Price: 25s. net.

BIOCHEMISTRY.

THE fact that a sixth edition of "A Textbook of Biochemistry", by A. T. Cameron, has been published during these strenuous times is a tribute to the popularity of the book and the industry of the author.[1] The present edition is in every way a better book than its predecessor, and it would be hard to find a more compact mass of biochemical facts than are in this compendium. The author has culled a wide field to keep the subject matter up to date and good use has been made of *Physiological Reviews* and *The Annual Review of Biochemistry*.

The author has included knowledge revealed by the application of isotopes in biochemical research, and it is pleasing to note that he has not hesitated to prune away dead conceptions which are prone to mummify in text-books. We should like to see a more liberal view taken of the significance of the respiratory quotient. The conception that the fasting respiratory quotient is a measure of the relative amounts of carbohydrate and fat being oxidized falls in the category of fossilized fallacies, as the respiratory quotient must be the resultant of countless oxidations and reductions proceeding in the various parts of the body. In this chapter on basal metabolism, the author on page 309 writes of the measurement of basal metabolism being carried out in two ways, the second way being by "indirect measurements of the oxygen consumption or the carbon dioxide production in a given time", whereas actually the direct measurement of oxygen consumption or carbon dioxide production is used to calculate the total metabolism indirectly. On page 220 the following statement stimulated the lachrymal glands: "Nothing specifically bearing on their function, the secretion of tears, is known concerning the chemical composition of the lacrymal glands."

On the whole this is a creditable book and should prove valuable for teachers and students in many fields of biochemistry.

[1] "A Textbook of Biochemistry for Students of Medicine and Science", by A. T. Cameron, M.A., D.Sc. (Edinburgh), F.I.C., F.R.C.S.; Sixth Edition; 1942. London: J. and A. Churchill, Limited. 8½" × 5½", pp. 384, with 28 illustrations. Price: 18s.

The Medical Journal of Australia

SATURDAY, DECEMBER 11, 1943.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

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PENICILLIN IN THE TREATMENT OF INFECTIONS.

In August last reference was made in these columns to penicillin, the new drug to which the description "unequalled and unobtainable" has been aptly applied. The early history of the preparation was outlined and its successful use in the treatment of certain infections was described in the light of articles that had appeared in *The Lancet*. The cases that were mentioned were only few in number, and though the conclusions reached by the English investigators are not questioned, additional evidence based on a larger series will be valuable. This evidence has been supplied by the Committee on Chemotherapeutic and Other Agents of the Division of Medical Sciences of the National Research Council, United States of America.[1] The committee, which comprises C. S. Keefer (chairman), F. G. Blake, E. K. Marshall, J. S. Lockwood and W. B. Wood, junior, has issued a report on five hundred cases. The report is of interest from at least two points of view. There is the interest attendant on the findings and there is a good object lesson on the way in which the National Research Council in the United States organizes such an investigation.

Turning first to the second of these aspects, we note from Keefer's report, as it may be called for convenience, and from a previous statement by A. N. Richards, Chairman of the Committee on Medical Research of the Office of Scientific Research and Development,[2] that practical interest in the subject was aroused in the United States by a visit paid by Professor H. W. Florey to that country from England in 1941. Florey's visit to the United States was arranged by the Rockefeller Foundation. After conferences between Florey and the National Research Council and the Department of Agriculture studies were initiated in the laboratories of the department. Florey also consulted with several commercial firms in the hope that they would undertake production developments. Early in the autumn of 1941 research aimed at production was started in the laboratories of four commercial houses. Interest spread and in May, 1922, sixteen companies were engaged or intended to become engaged in the production of penicillin. The 500 patients on whom Keefer's report is based were treated by twenty-two groups of investigators (their names are given in a footnote) accredited to the Committee on Therapeutic and Other Agents. The penicillin used was manufactured by three commercial houses and its costs were covered by a contract of the Office of Scientific Research and Development on the recommendation of the Committee on Medical Research.

The first thing to be noted in regard to our second division of the subject is that penicillin may be given by the intravenous or intramuscular route and that it may be used as a local application. It is ineffective when given by mouth, for it is destroyed rapidly by gastric juice, the destructive action of which is due to hydrochloric acid and not to pepsin. After intravenous or intramuscular injection penicillin is excreted rapidly in the urine (it is also excreted by the liver); if therefore an adequate amount of potent material is to be obtained in the circulating blood and in the tissues, the drug must be injected continuously or at frequent intervals. Keefer states that it was not possible to detect penicillin in the cerebro-spinal fluid after intravenous or intramuscular injection; for this reason in the treatment of meningitis it is well to use the drug both intravenously and intrathecally. Incidentally it should be noted that it has been possible to produce *in vitro* strains of *Staphylococcus aureus* that are resistant to penicillin. An increase in the resistance of *Staphylococcus aureus* has also been demonstrated during the course of penicillin therapy for localized infections in man. Strains of resistant pneumococci and hæmolytic streptococci have also been produced both *in vitro* and *in vivo*. Again, penicillin-fast strains of pneumococci are susceptible to the sulphonamides and sulphonamide-resistant strains of pneumococci are susceptible to penicillin. On the other hand an increase in the resistance of organisms to penicillin is associated with a proportionate loss of virulence; this is in striking contrast to the retention of virulence by sulphonamide-resistant cultures. In a review such as the present it is not necessary to give full details of dosage. It will suffice to state that from 500,000 to 1,000,000 units are needed for serious staphylococcal infections; 100,000 to 160,000 units are required in sulphonamide-resistant cases of gonorrhœa; and 100,000 units in pneumococcal pneumonia.

In regard to the results of treatment in the 500 cases, the best results were obtained in the treatment of staphylococcal, gonococcal, pneumococcal, and hæmolytic streptococcal infections. Disappointing results were obtained in bacterial endocarditis. The impression appears to be prevalent that penicillin almost always effects a cure; this impression will be corrected by the results recorded in Keefer's report. Among the 500 cases there were 366 in which recovery or improvement took place; there were 94 deaths, and in 46 cases penicillin had no effect. Among 228 infections due to *Staphylococcus aureus* there were 91 associated with bacteriæmia; in 54 recovery or improvement was recorded; there were 34 deaths and three cases with no effect. Among 137 non-bacteriæmic cases there were 109 with recovery or improvement, 11 deaths and 17

[1] *The Journal of the American Medical Association*, August 28, 1943.
[2] *The Journal of the American Medical Association*, May 22, 1943.

with no effect. Among 23 infections due to hæmolytic streptococci there were 13 with recovery or improvement, seven deaths and three with no effect. Among 76 pneumococcal infections there were 45 with recovery or improvement, 29 deaths and two with no effect. Among 17 cases of subacute bacterial endocarditis there were three with recovery or improvement, four deaths and ten with no effect. In every one of 129 gonococcal infections recovery or improvement resulted. This bare statement of results does not give a satisfactory idea of what penicillin can do. Many of the infections in which death occurred were acute and extensive; in some instances the patients came under treatment when the infection was well advanced. Penicillin is a bacteriostatic and not a bactericidal agent, and the record compiled by Keefer shows the importance of the early inception of treatment. Fortunately the toxic effects are extremely rare. This, Keefer points out, is the more remarkable in his series because the material available for clinical testing was not more than 10% or 15% pure penicillin. Of the extraordinary value of penicillin there can be no doubt. Two facts, however, are clear—it is not a panacea and more remains to be learned about it. Richards in his statement made it clear that for some time to come the supply for civilian needs would be very limited—a warning similar to that issued in England. Australian practitioners would welcome an announcement that penicillin was being manufactured in the Commonwealth.

Current Comment.

CARCINOMA OF THE STOMACH.

THE whole June, 1943, issue of *Archives of Surgery* is devoted to a symposium on carcinoma of the stomach. Twelve papers have been contributed by twenty-three authors. As there is hardly any number of a surgical, medical or pathological journal that does not contain some contribution to the problem of gastric cancer, one might well ask whether such a symposium is justified and whether it is worth while commenting upon it. The answer to this question is provided by the last paper which will for this reason be discussed first.

W. Walters, H. K. Gray and J. T. Priestly deal with the prognosis and end results in the treatment of cancer of the stomach. In a series of nearly 11,000 cases seen in the Mayo Clinic from 1907 to 1938 only slightly more than half the patients (57·3%) were considered to be in the operable stage of the disease. But a resection of the tumour could be actually performed in less than half of the cases of this group. Of these patients who were operated on about 16% died in the immediate post-operative period, so that from the original series of nearly 11,000 patients only about 2,300 (accurately 21·3%) had a chance of cure. Of these patients only 28·9% were alive at the end of five years. The authors insist that the figures for the last few years are decidedly better than those for the whole series, but on the other hand it will have to be remembered that the results of the Mayo Clinic will be more favourable than those of the average hospital. The stark fact that even under the best conditions not quite 8% of all patients seen survived for more than five years justifies every effort to improve this most deplorable state of affairs. The symposium and the present comment on it may be a contribution towards this end.

In the first paper of the symposium, A. Nettleship investigates the help that can be expected from an experimental approach to the problem. Animal experiments to determine the fundamental causation and the pathogenesis of gastric carcinoma have been largely unsuccessful. They were handicapped from the start on account of the rarity of spontaneous adenocarcinoma of the stomach in laboratory animals. It has been the general experience that it is difficult and often impossible to reproduce human conditions in animals when comparable lesions do not occur spontaneously in them. Apart from this, Nettleship thinks that the approach has not been right. Most investigators have tried to produce carcinomata in previously normal stomachs, and the fact that carcinoma in the human being does not arise, in his opinion, in a normal but in a somewhat pathological stomach, should have been taken into consideration. The most important conditions which precede the development of a carcinoma are, according to him, polypus, atrophic gastritis and ulcer. He therefore suggests that animals, in which these lesions can be fairly easily produced, should be studied carefully over a great length of time and that the experimentalists should make use of the common laboratory procedures which are available for the study of the human disease: biopsy, gastroscopy and chemical determinations of the stomach secretions. A study of secondary factors which might cause in animals the transformation of the benign into malignant lesions, might lead to a closer grasp of the causation of human gastric carcinoma.

In the second paper, A. P. Stout deals with the pathology of carcinoma of the stomach. He begins with a discussion of the lesions preceding the development of carcinoma. In his opinion polypi account only for a very small number of carcinomata. On the other hand he is, as he declares, one of those who believe that carcinomata can, and do, form in the margin of a preexisting chronic ulcer and that such tumours differ from ulcerated carcinomata. He is convinced that in his series of 82 cases, the carcinoma developed in 11 of them (13·4%) at the margin of an ulcer. This figure is about three times as high as those usually quoted for such occurrences. With regard to the connexion between chronic gastritis and carcinoma, he thinks that the evidence is exceedingly nebulous and conflicting. He then goes on to discuss the histopathology of the gastric carcinoma. In his experience, attempts to predict the degree of malignancy, the rate of growth and the probable success or failure of surgical treatment based on cellular differentiation alone, as has been suggested in the literature, are of very little value when applied to an individual case, although some difference may appear in large groups. It is more valuable, in his opinion, to determine by microscopic examination the direction and extent of the spread and the relation of tumour cells to blood and lymphatic vessels and lymph nodes, and to describe the gross forms of carcinoma, since it is important for diagnostic procedures to know these and also since they have some bearing on prognosis. The first type, the fungating carcinoma, grows principally into the lumen with delayed and restrained penetration into and along the stomach wall. It is unfortunate that these tumours form only about 10% of all gastric carcinomata, because as a class they metastasize slowly and the rate of five-year cures following resection is better than 50%. In the second group—that of ulcerated carcinoma—the author is mainly concerned with pointing out the differences between a primary carcinoma that has become ulcerated and one that has developed at the margin of a previous peptic ulcer. On the whole, this type of tumour is not more common than the first group, and has likewise a somewhat more favourable prognosis. The third form—the spreading cancer—has two subgroups. One is called *linitis plastica* or leather bottle stomach. In this peculiar condition the entire stomach gradually becomes stiffened by fibrous tissue which forms chiefly in the submucosa, muscularis and subserosa. The mucosa remains practically intact. Isolated groups of carcinomatous cells are scattered at such wide intervals through the fibrous tissue that it is sometimes difficult to find them. In the other subgroup the tumour spreads very superficially over wide areas of the mucosa, but does not easily involve the muscular wall. However, it has a tendency to invade the lymphatics, and to metastasize. The fourth group, which is called "of no special type", includes about half of the author's material,

rather late cases in which such extensive tumour growth had occurred that it was not possible to assign them to any of the other types. A discussion of the spread and the metastases of gastric carcinoma follows, and of special interest is the description of the invasion of the duodenum which occurs mainly in the outer coats, but hardly ever in the mucosa. A short account of lesions that might simulate gastric carcinoma concludes this paper.

The next paper by L. W. Guiss and F. W. Stewart deals with the question of the ætiological importance of chronic atrophic gastritis for the subsequent development of gastric carcinoma. Although there is, at present, a wide divergence of opinion—some authors hold that about 85% of the carcinomata develop on the basis of an atrophic gastritis, while others are equally convinced that a connexion between the two lesions has never been unequivocally proved—there can be no doubt about the actual finding that carcinoma and atrophic gastritis are present together in the same stomach in most of the cases. Guiss and Stewart suggest that four distinctly different conclusions are possible: (i) chronic atrophic gastritis may commonly occur in the higher age groups; (ii) it may be the cause; (iii) it may be the result of gastric carcinoma; (iv) it may be a non-specific concomitant of carcinoma as well as of other gastric lesions. Only if very early carcinomata of the stomach could be proved to be consistently associated with the presence or the absence of gastritis would the problem of relationship be solved. Unfortunately, no investigator has seen more than a very few cases of early gastric carcinoma. The authors therefore set out to study (*a*) the characteristics of a "normal" stomach, (*b*) the changes that might be expected with advancing age, (*c*) any non-specific changes associated with the presence of carcinoma elsewhere in the body, (*d*) the mucosal changes in gastric carcinoma and especially whether they differed significantly from the mucosal changes found in association with non-carcinomatous gastric lesions. Space allows us to give an account of only their most important conclusions. Of stomachs from apparently normal persons who died at the age of over forty, 82% showed microscopic evidence of chronic atrophic gastritis; 66% of stomachs from persons over forty who died of extragastric carcinoma showed chronic gastritis; 97% of stomachs with carcinoma showed associated chronic gastritis, but there is a similar incidence of chronic gastritis in association with gastric diseases other than carcinoma. The chronic gastritis found in cases of gastric carcinoma is in the author's opinion a non-specific reaction to inflammation and gastric injury in general, and not an ætiological factor.

In the next paper J. C. Abels, I. Ariel, P. E. Rekers, G. T. Pack and C. P. Rhoads report on their investigations of metabolic abnormalities associated with gastric carcinoma. The authors have so far investigated the disturbances in distribution of vitamin *A*, the incidence, nature and cause of the associated hypoproteinæmia, hepatic dysfunction, and the metabolic abnormalities which complicate the post-operative period. They found that the vitamin *A* level in the plasma was below the normal range in 86% of the patients with gastro-intestinal carcinoma. This apparently was not due to dietary deficiency, malabsorption of the vitamin, or inability of the liver to store vitamin *A*. The possible causes are either a specific hepatic dysfunction or a retention of the fat-soluble vitamin in a liver with fatty infiltration. The hypoproteinæmia found in 59% of patients with gastric carcinoma is probably also due to hepatic dysfunction. Hepatic function was further studied by six different tests and again there was a marked difference between normal persons and patients with cancer. Attention is further drawn to the anæmia and hypoprothrombinæmia which are often refractory to treatment. When present, they increase the risk of operation, and may lead to serious complications in the post-operative period. Lastly, it is pointed out that a total and even subtotal gastric resection, although necessary for the surgical treatment of the disease, may institute a new metabolic disturbance, steatorrhœa, and consequent loss of weight.

B. R. Kirklin discusses mistakes and misunderstandings in the röntgenological diagnosis of gastric carcinoma, and avoidable errors and insurmountable difficulties are pointed out.

L. Schiff deals with the gastroscopic diagnosis of carcinoma. This article confirms previous reports that a gastric carcinoma of the stomach can often be correctly diagnosed through the gastroscope, that in a small number of cases the gastroscopic examination may be the sole means of revealing the presence of the tumour, but that in another small number of cases lesions are situated in a "blind" area and cannot be seen.

In the next paper, I. S. Ravdin, H. P. Royster, C. Riegel and J. E. Rhoads discuss the surgical care of patients with gastric cancer before and after operation. Physiological investigations have shown them that the problems requiring special attention in the pre-operative period are dilatation of the stomach and infection of the gastric contents. The water and electrolyte balance and the vitamin intake have to be constantly checked before and after operation. The protein deficiency is best managed in their experience by blood transfusion before operation and by jejunal feeding after operation.

O. H. Wangensteen's paper entitled "The Surgical Problem of Gastric Cancer" again stresses the difficulties in diagnosis and the importance of pre-operative preparation for which detailed instructions are given, and then turns to the surgical procedures themselves. The procedures are discussed in great detail and it is noteworthy that the author advocates the excision of the entire lesser curvature as a routine procedure, and holds that resection of parts of the liver is justified in cases of direct carcinomatous extension from the stomach into the liver. Well-planned post-operative procedures for which again detailed instructions are given should, in his opinion, eliminate most of the post-operative complications.

The three final papers deal with special surgical problems. R. R. Graham describes his method of total gastrectomy; a paper by D. B. Phemister and another one by G. T. Pack and W. L. Watson describe methods of transthoracic resection for carcinoma of the cardiac end of the stomach. In one case described by the two last-mentioned authors, a large portion of the lower end of the œsophagus was involved so that a subtotal œsophagectomy with subsequent construction of a prethoracic artificial œsophagus was performed in addition.

The symposium concludes with the evaluation of prognosis and end results of gastric carcinoma; this has been discussed in the beginning of this comment. It might be worth while to recall that so far not more than 8% of patients with gastric carcinoma survive for five years. The papers commented upon have shown the various ways in which the problem is approached at the present moment; they also show that proper management may appreciably improve the results usually obtained. The crux of the matter is, however, the problem of early diagnosis. It is true that many tumours develop without any signs and symptoms to inoperable stages, but if only a percentage of the patients who are treated (or treat themselves) for "indigestion" would receive early special investigation, the outlook would be much brighter. This is a field where the general practitioner has one of his most important and gratifying tasks. A decisive improvement can result only from his unceasing efforts. Not only will his alertness have to be taxed to the utmost, he will also have to conduct an educational campaign amongst his patients. What can be achieved in this way has been shown by the vast improvement of the figures for early diagnosis of carcinoma of the uterus and the mamma. At the same time it is true that these organs are much more readily accessible to investigation, and that the diagnosis can be more easily confirmed by biopsy. The application of all modern diagnostic procedures to every patient with only vague gastric symptoms is still impeded by a number of factors amongst which the economical one is unfortunately rather important. Too often practitioners insist on, and patients agree to, their performance only when symptoms are pronounced, that is, when it is too late. Without some adjustment in this direction a decisive advance in the problem of early diagnosis of carcinoma of the stomach cannot be expected.

Abstracts from Medical Literature.

RADIOLOGY.

Polyostotic Fibrous Dysplasia.

N. J. FURST AND R. SHAPIRO (*American Journal of Roentgenology*, May, 1943) state that although the diagnosis of polyostotic fibrous dysplasia may be suspected clinically, it cannot be established with certainty without a radiological examination. The radiographic appearance of the bone lesions is characteristic. The findings may be summarized as follows: (i) The skeletal involvement has some tendency to be unilateral in distribution, but bilateral lesions are not uncommon. (ii) Contrary to the findings in hyperparathyreoidism, no generalized decalcification of the bones is present. The lesions are spotty in distribution, consisting of multiple localized areas of diseased bone with normal osseous tissue between. (iii) The characteristic lesions are areas of rarefaction resembling bone cysts. These vary considerably in size and shape, and may occur in flat as well as in long bones. The borders of the fibrocystic-like lesions may be sharply defined or gradually fade into the surrounding normal bone tissue. The lesions are not true cysts. The X-ray appearance is due to the replacement of the bone by the fibrous tissue. (iv) Along with the cyst-like changes, areas of increased density are observed. These vary in extent and may be so pronounced as to result in almost complete obliteration of the medullary canal. Such lesions are particularly prone to occur in the skull, especially at the base in the region of the floor of the anterior fossa. (v) There is marked thinning of the cortex, along with broadening or expansion of the involved bones. The cortical outline usually remains intact, but may occasionally be broken, even in the absence of a pathological fracture. (vi) Periosteal reaction rarely occurs except at the site of fracture. (vii) Advanced bone age and early epiphyseal union may be present. (viii) Frequently the epiphyses remain intact in the face of diffuse diaphyseal involvement. (ix) Various secondary deformities of the involved bones may be present, for example, *coxa vara* bowing of the femur and tibia. (x) Pathological fractures are not uncommon. (xi) The skull is a frequent site of the disease process, and may be involved in various ways: (*a*) Irregular dense areas along with fibrocystic-like involvement may be present, producing a picture not unlike Paget's disease. (*b*) Extensive sharply demarcated areas of rarefaction may may occur, simulating xanthomatosis to some extent. (*c*) The bones of the face and orbit may be involved in a dense, fibrotic process resembling *leontiasis ossea*. (*d*) The mastoid cells and paranasal sinuses may be obliterated by the dense fibrous deposits, and the extension of the disease process into the bones of the face and orbit may lead to facial asymmetry and ocular proptosis.

Increased Filtration for Diagnostic Purposes.

SYDNEY J. HAWLEY (*Radiology*, April, 1943) remarks that the introduction of filters into the beam of X rays in the diagnostic range improves both the sharpness and the number of identifiable values. One millimetre of aluminium makes slight difference as compared with no filter. Increasing the filtration up to three or four millimetres of aluminium produces material improvement, which is only slightly enhanced by increasing to six millimetres. Beyond this latter figure there is no appreciable gain. Filtration reduces the intensity of the whole beam, but particularly in the longer wave-lengths. The first effect, an increase in sharpness of outline, is probably due to a decrease in the scattering which follows reduction in the proportion of long wave-lengths. A slight increase in sharpness is obtained by introducing one millimetre of aluminium; a marked increase if three millimetres of aluminium are used. This difference is readily visible to the naked eye. There is only a slight further increase in sharpness with six millimetres of aluminium, not visible to the naked eye. The advantages of increased filtration are apparent, whether or not intensifying screens are used in films made with the Bucky diaphragm and in non-screen films. The increased sharpness is not so apparent in films of the hands and feet, where the objects to be examined can be brought close to the film. Even in this situation, however, the advantage lies with the films made with a filtered beam, as a better balance between bone and soft tissue density is obtained. Another place where it is advantageous to increase the filtration is in those parts where there is a marked inequality of thickness, as in some thighs, or the chest in stout patients with large breasts. Owing to the increased number of visible values, the entire area will be more evenly illuminated. The addition of three millimetres of aluminium requires about a 10% increase in exposure, by increasing either the kilovoltage or the time.

Correlation of Disability with X-Ray Findings following Head Injuries.

LESLIE H. OSMOND (*Radiology*, July, 1943) states that the simple linear fracture of the skull in itself usually means nothing as regards disability. Few cases subsequently show encephalographic evidence of cerebral damage. Of far greater significance is the fracture which crosses or courses along vascular channels, particularly the middle meningeal vascular groove, for there is apt to be a tear in the vessel with the production of an epidural hæmorrhage. When the fracture line enters a mastoid, a paranasal sinus or the nasal passage, the prognostic significance is more grave, for in these cases osteomyelitis, meningitis, meningo-encephalitis and brain abscess are not uncommon sequelæ. When the fracture line passes through channels of exit of nerves, disability due to nerve injury may follow. The comminuted fracture, which is common in the vault and infrequent in the base, is often the tell-tale evidence of underlying cerebral damage. In depressed fractures, which involve the vault in the great majority of cases, the amount of depression of the inner plate should be measured on tangential films. If this is five millimetres or more, there is probable pressure on the brain, which should be relieved, for thereby a decrease in the sequelæ may be expected. The earlier such treatment is carried out, the less danger there is of permanent injury to the brain, and the less likely the patient is to have convulsions at a later date. From the radiological appearance of old fractures, it is possible to detect evidence of sufficient pathological change in the brain or its coverings to explain varying degrees of disability. The old residual linear type of fracture without calcification beneath the inner table is of little importance in establishing disability, but in the comminuted and depressed types either of two changes may occur which are of significance. The first is thickening of the bone not only immediately adjacent to the fracture, but also in that part considerably removed from it. Occasionally the air sinuses on the side of the fracture are hypertrophied. In these cases generalized atrophy or more localized degeneration of the brain may be expected. The second change which is often seen at the site of old fractures is a widening of the defect, with associated thinning of the bone at the margins. There may be scalloping or lacunæ and an increased vascularity of the inner table of the skull along the fracture margins. When this is seen, one may predict a dense fibrotic leptomeningeal reaction with loculated cyst-like collections of fluid at the site of the defect. In this condition the erosion of bone results from the pressure of the cystic collections of fluid on the skull with each pulsation of the brain. As a rule, there are in such patients varying degrees of atrophy of the brain and asymmetry of the skull.

Oil Aspiration Pneumonia.

MORRIS MOEL AND HENRY K. TAYLOR (*American Journal of Roentgenology*, February, 1943) state that the diagnosis of oil aspiration pneumonia should always be considered when on serial studies there are evidences of a protracted bronchopneumonia in an individual with a history of oil administration and difficulty in swallowing. The extent of the involvement depends on the quantity of oil in the lung, regardless of whether it was aspirated in a single large dose or in repeated small doses. Patients having only a mild involvement showed an increase in the size and density of the lung markings and hilar shadows. Scattered small areas of increased density may be present about the hilar shadows. These findings are pronounced in cases with moderate involvement. In the severe cases the perihilar shadows spread out toward the periphery of the lungs, usually leaving a narrow clear zone adjacent to the axillary chest wall. A true lobar pneumonia is not observed unless a non-lipoid pneumonia is superimposed. With oil aspiration pneumonia there is little or no change in the appearance of the lung fields on serial radiographs. This, together with the history of oil administration and difficulty in swallowing, should establish the diagnosis. The severity of the reaction depends upon the type of oil used. Vegetable oils, as a group, are least irritating and least toxic, producing a slight degree of proliferative reaction with invasion of macrophages. The pure vegetable oils, such as olive oil, cotton seed oil and oil of sesame, lie free in the alveoli, produce no symptoms, and may be largely removed by coughing and

expectoration. Chaulmoogra, a vegetable oil, has been found to be very damaging because of its high fatty acid content. Animal oils as a group are the most toxic. This is due to their high fatty acid value and the ease with which they undergo hydrolysis. The more unsaturated the oil, the easier it hydrolyzes, the greater the reaction. For this reason the most toxic of the animal oils is cod liver oil. Unlike animal and vegetable oils, liquid petrolatum is chemically inert, and acts purely as a foreign body in the pulmonary parenchyma. Medicinal agents, such as menthol, thymol and ephedrine, are responsible for an acute, diffuse, exudative inflammation, because of the chemical irritation to the lungs.

Gastric Herniation at the Œsophageal Hiatus.

JOHN W. TURNER (*American Journal of Roentgenology*, July, 1943) states that the functional pathology of herniation at the œsophageal hiatus is worthy of close attention. Interference with the vascular supply of the herniated portion of stomach has been observed gastroscopically, as well as in post-mortem studies, to produce local congestion of the herniated mucosa and gastritis. There may be erosion of superficial vessels and ulceration as a result of persistence of this process. Pyrosis easily results from the retrograde passage of gastric contents into the terminal portion of the œsophagus. Repeated instances of this may lead to œsophageal peptic ulcer formation with all its possible complications. Local œsophageal spasm is not a surprising consequence of such regurgitation. The contour of the normal œsophageal *ampulla phrenica* and mucosal pattern should be carefully established. In some cases the distinction is obvious, but in others multiple fluorographic exposures are valuable to aid in establishing these important points. To see gastric rugæ traversing the hiatus suffices for a positive diagnosis of the presence of herniation. Mobility and the degree of constriction should be estimated as nearly as possible in each patient who has gastric herniation because of the relation to symptoms of the presence of incarceration and adhesions. The observation of the barium-filled stomach in the supine patient during the Muller effort is suggested as an aid to study of functional calibre of the hiatus. A broadly dilated œsophageal hiatus with a freely mobile and distensible herniating portion of stomach and normal rugal pattern is least often connected with symptoms. Conversely, a portion of stomach persistently herniated at the hiatus with no mobility, limited distensibility and marked prominence of rugal pattern is most likely to be directly productive of symptoms. Hiatus hernia is almost never confused clinically with peptic ulcer, but is frequently confused with gastric cancer. The condition rarely produces dysphagia.

PHYSICAL THERAPY.

Radiation Treatment of the Painful Shoulder.

A. A. BREWER AND O. C. ZINK (*The Journal of the American Medical Association*, July 17, 1943) have found radiation treatment successful in acute subdeltoid bursitis. They point out that although any method of treatment of the condition may produce relief of symptoms and cure, yet irradiation strikingly reduces the time of disability from a period of weeks to a period of hours. The physical factors employed are 200 kilovolts (constant potential), 18 milliamperes, 0·5 millimetre of copper *plus* 1·0 millimetre of aluminium filter (1·18 millimetres of copper half value layer), 50 centimetres' target-skin distance and a 10 by 15 centimetre port directed towards the antero-lateral aspect of the affected shoulder. A single treatment with a dose of 300 *r* is usually sufficient, although this may be repeated within seven to ten days if relief has been incomplete. The typical response to treatment is frequently aggravation of symptoms for eight to twenty-four hours, and therefore adequate analgesics should be provided and the arm placed in a sling. The period of aggravation of symptoms is followed by rapid relief of the pain and limitation of movement, and generally the patient is able to resume his activities in twenty-four to forty-eight hours after treatment. Residual tenderness usually disappears in a few days, and in many instances the calcium deposits will be found to have disappeared if X-ray examination is repeated within a few weeks. If no improvement in the patient's condition has taken place at the end of forty-eight hours, operative treatment should be considered. The authors have not found the treatment so successful in chronic bursitis; only an occasional one of their patients has been cured by it. But relief of varying degrees is afforded as a rule, and if this is the case further treatment along these lines is justified. If symptomatic relief is not apparent within ten days after treatment, then treatment should be considered a failure. But as chronic bursitis responds poorly to any form of treatment, the authors consider that patients suffering from this condition should be submitted to a trial of radiation therapy before more radical procedures are undertaken.

Total Body Irradiation.

F. G. MEDINGER AND L. F. CRAVER (*American Journal of Roentgenology*, November, 1942) present a critical analysis of the records of 270 patients treated at the Memorial Hospital, New York, by total body irradiation over a ten-year period from 1931 to 1940. The purpose of the study is, if possible, (i) to learn more exact indications for total body irradiation, (ii) to estimate the end-results, not only as measured by palliation of the patient's condition, but in the large groups of cases of Hodgkin's disease, lymphosarcoma and the leuchæmias, by determination of the survival rates following therapy, (iii) to compare the survival rates of patients thus treated with those of patients receiving no treatment or given other forms of therapy, (iv) to determine the exact dangers of and contraindications to this method of treatment, (v) to analyse the changes in the blood picture following total body irradiation. The X-ray unit has been placed in the wall between two single rooms, and treatment can be carried out in one or more rooms simultaneously. The voltage employed is 185 kilovolts, and the distance from the X-ray tube to the patient is three metres. The output is now 0·86 *r* per hour, giving about 17 *r* per day (measured in air). The unit operates during twenty or twenty-one hours of each twenty-four period, and a dose of 100 *r* requires about six days of treatment. Leucopenia resulting from depression of the bone marrow is the most important complication of total body irradiation, and whenever possible it should be avoided. The results of this series of cases indicate that total body irradiation produces the greatest benefit when combined with local high voltage X-ray therapy. Total body irradiation has its greatest usefulness in the treatment of the lymphatoid diseases. Little or no benefit follows its use in the treatment of generalized carcinoma or sarcoma. The survival period, as well as the period of active useful life, is prolonged in cases of Hodgkin's disease, lymphosarcoma and chronic lymphatic leuchæmia. Favourable palliation followed the use of total body irradiation in small groups of patients suffering from chronic myelogenous leuchæmia, *polycythæmia vera*, *mycosis fungoides* and multiple myeloma. Acute leuchæmia is not favourably affected by this form of therapy.

Treatment of Carcinoma of the Cervix Uteri.

H. DOBNEY KERR, in an editorial in *Radiology* of May, 1943, expresses the opinion that if a generalization is warranted regarding the treatment of any malignant neoplasm, it is that carcinoma of the *cervix uteri* should always be treated by irradiation. This is the teaching in all the reputable medical journals and medical schools, and the judgement of those physicians who have the most to do with the care of patients suffering from this disease. This means that the competent radiologist or the gynæcologist trained in irradiation therapy should treat all patients with proved cervical carcinoma. These physicians must have had training and experience, must be conversant with the physical factors that affect depth dosage, and must be able to estimate with a reasonable degree of accuracy the amount of irradiation delivered to the tumour. Not only should this be true for external irradiation, but also for transvaginal Röntgen therapy and for intrauterine application of radium. The term "milligramme hours" is not in itself a true indication of radium dosage. Since at present we must assume that the effect on the tumour is dependent primarily on delivered radiation, it is necessary to use every means at our disposal to increase this amount within the limits of tolerance of normal tissue. More and more we must realize that adequate irradiation for carcinoma of the cervix is a major procedure, and that to increase the percentage of five-year survivals we must increase the complications in the form of skin, bowel and bladder reactions resulting from the treatment. The possibility of the development of these complications should not deter us from giving maximum doses. This attitude has enabled some radiologists to increase the five-year survival rate by 100% in the past ten years. With heavy irradiation one can now expect up to 40% of five-year survivals when all groups of the lesion are taken together.

British Medical Association News.

VICTORIAN BRANCH NEWS.

THE following are the results of the ballot for election of members of the Council of the Victorian Branch of the British Medical Association and of the Committee of the Medical Society of Victoria for the year 1944, together with the votes polled. (The total number of votes polled was 438; three votes were informal.)

1.	Dr. John S. Green	422
2.	Dr. D. M. Embelton	419
3.	Professor P. MacCallum	416
4.	Dr. H. C. Colville	413
5.	Dr. F. Kingsley Norris	404
6.	Dr. Robert Southby	402
7.	Dr. John Dale	401
8.	Dr. John H. Gowland	389
8.	Dr. Euan I. Littlejohn	389
10.	Dr. Douglas Thomas	382
11.	Dr. Arthur Brown	381
12.	Dr. Kenneth Smith	371
13.	Dr. Charles Byrne	364
14.	Dr. Leonard W. Johnston	281
15.	Dr. G. H. Guthridge	247
16.	Dr. Thomas King	167
17.	Dr. Henry Mortensen	129
18.	Dr. Gerald Doyle	113

The Royal Australasian College of Physicians.

EXAMINATION FOR MEMBERSHIP.

PROVIDED a sufficient number of candidates is offering and if circumstances permit, an examination for membership of the Royal Australasian College of Physicians will be held at Sydney in March and April, 1944. The examinations will consist of: (i) A paper on the principles and practice of medicine, including pathology, therapeutics and the history of medicine. (ii) An oral examination, which may include the clinical examination of patients, together with the identification of naked-eye and microscopic specimens.

The written paper will be taken in capital cities where candidates are offering on Saturday, March 25, 1944, and the corresponding clinical examination will be held at Sydney on Wednesday and Thursday, April 19 and 20, 1944.

Application forms may be obtained from the office of the College, 145, Macquarie Street, Sydney, and should be in the hands of the Honorary Secretary at this address not later than Saturday, February 26, 1944.

Public Health.

WARNING NOTICE.

THE following warning notice is published at the request of the Honourable the Minister of Health for Victoria.

The preservation of vegetables, other than tomatoes or rhubarb, by bottling at home, is dangerous unless certain precautions are taken. Vegetables may be infected with the organism *Clostridium botulinum*. The spores of the organism are not destroyed by heating to the temperature of boiling water, and, in sealed bottles and tins containing non-acid products such as vegetables and meats, the organism if present will produce a poison so powerful that the smallest taste of the infected contents may cause death.

The above warning does not apply to the bottling of fruits, tomatoes or rhubarb. This is quite safe.

Home-bottled vegetables can be rendered safe, as the poison is destroyed by boiling for ten minutes immediately prior to use.

Vegetables may be preserved with safety by salting, drying or pickling.

Correspondence.

DEATH FOLLOWING CIRCUMCISION.

SIR: The following case may be of interest on account of its extreme rarity. In the limited library at my disposal, there is no mention of a fatality following circumcision. None of my three colleagues had ever heard of such a tragedy until my case cropped up. On August 31, 1943, I delivered a mother of a male baby. During his first week of life, some transient jaundice was observed. This cleared up without any specific treatment and was never worrying. The baby was breast fed and appeared perfectly healthy. On September 9 I circumcised the baby. The jaundice had by now completely cleared.

I do not think there is any point in detailing my technique for this operation. It should be adequate to state that it is a recognized technique taught to me when I was a resident medical officer at both the Alfred Hospital and the Children's Hospital, Melbourne. In my subsequent seven and a half years' practice at Swan Hill I have used the same technique in every case, and no serious complications have ever occurred.

The after-treatment of these wounds is carried out by the sister and is as follows. I first dress the wound myself with gauze impregnated with friar's balsam. This is left in place for two days. On the third morning after the operation, the sister herself removes the dressing and applies a sterile "Vaseline" gauze dressing. Two days later this dressing is renewed. The mother is shown how to do the dressing by the sister, and is discharged from hospital with a small pot of sterile "Vaseline" and some rolled gauze. She is instructed to change the dressing two days later—that is, seven days after the operation. By this time the wound has usually healed. If it has not healed, the mother is advised to return to me.

In the case in point this procedure was carried out. I made the routine inquiries about the wound from the sister concerned. I have implicit confidence in her. She told me that when the baby was discharged from hospital a slight trace of infection was present, but that this was of no clinical importance. I have found that in nearly every case circumcision wounds exhibit some slight inflammatory reaction. I have never regarded it seriously. The mother and baby were discharged from hospital five days after the circumcision. Nine days after the operation the mother brought the baby to my surgery. The glans was covered with hard white pus. The skin was healthy. Slight infection was present at the junction of the skin and the mucosa. The pus was hard and would not wash off. The three catgut sutures had not been absorbed and were visible. There was some pus over the urethral meatus. Fearing that this might be acting as a partial obstruction to the outflow of urine, I probed the meatus gently with the blunt end of a Watson-Cheyne dissector. There was an immediate rush of urine under pressure. The mother informed me that the baby had been micturating normally, but that she had observed a ragged, split stream.

I was not particularly worried. The baby looked quite well, and although infection was present, I did not regard it as being clinically serious. I prescribed hot saline irrigations to the wound and dressings of "Boro-glyceride" ointment. This treatment was to be carried out whenever the napkin required changing.

One week later—that is, a fortnight after the circumcision—the baby was again brought to my surgery. The mother again told me that the baby was micturating quite freely, but that the stream was still ragged. Less pus was present, but I again very gently probed the meatus, and a single stream of urine under pressure followed. On this occasion, a drop of bright blood appeared at the meatus. I ordered hourly fomentations. I was still unalarmed. Five days later the whole penis presented a very different appearance. It was small and shrivelled. The glans was free of pus, but was of a blue colour. I could see no skin, as the infection had spread back to the root of the penis, and the area was covered with pus. I immediately had the baby readmitted to hospital, and ordered hourly foments and hot saline baths throughout the twenty-four hours. The following morning I asked one of my colleagues to hold a consultation with me about the case. The change overnight in the appearance of the penis had been rapid. The glans was gangrenous, and the whole penis was very small. The baby was looking ill, but was still passing urine. We had to agree that a portion of the penis would certainly drop off. My colleague suggested as a dressing 10% of sulphanilamide powder

incorporated in *Unguentum Hydrargyri Ammoniati Dilutum*. He also suggested a few radial incisions into the skin of the pubic area where the external portion of the penis joins it. We thought some inflammatory constriction might be present at this site. I made a few incisions, but no thickening could be felt. This dressing was applied three times a day and the baby continued to pass urine.

On October 4 the baby's general condition had deteriorated, but he was still passing urine. The *glans penis* was jet black, but the rest of the penis was still covered in pus. On October 5 it became obvious that the baby was going to die. The next day the gangrenous area sloughed into the dressing. This area consisted of the outer shell of the penis, and appeared as a cast. The remnant of the penis was just large enough to be dressed. It consisted of the urethra and *corpora cavernosa*, still covered in pus. The baby was still able to pass urine. On October 7, which was twenty-nine days after the circumcision, he died at 1.45 a.m.

An autopsy performed by me revealed the following abnormalities. (i) There were four spherical masses in the liver; three were in the right lobe and one in the left. They were situated deeply in the liver substance, and on section were slightly paler than the surrounding liver tissue. I do not know what these were. (ii) An accessory spleen was present. (iii) Both ureters were dilated. (iv) The bladder was distended and full of clear urine. (v) The apex of the bladder and the membranous and bulbous portions of the urethra were firmly adherent to the inferior ramus of the left *os pubis*. They were adherent to this bone, one inch to the left of the *symphysis pubis*. The external portion of the penis emerged from the pelvis in the mid-line. Thus pronounced angulation was present. The remnant of the penis outside the pelvis was half an inch long and a quarter of an inch in diameter.

Yours, etc.,
E. H. BARRETT, M.B., B.S.

Swan Hill,
Victoria,
November 9, 1943.

TREATMENT OF PEPTIC ULCER AND TOXIC GOITRE.

SIR: For some time past I have been getting encouraging results in the treatment of peptic ulcer by treatment with sulphanilamide tablets (powdered). In several cases, both by clinical signs and barium meal examination, apparent cures have been obtained. Might I also state here that in some cases of toxic goitre treatment with vitamin B_1 (tablets and parenteral injections) has cleared up the toxic symptoms and the basal metabolic rate has returned to normal.

Yours, etc.,
J. P. HASTINGS, M.D.

249, Ponsonby Road,
Auckland, W.1,
New Zealand.
September 7, 1943.

THE MEETING OF THE FEDERAL COUNCIL.

SIR: Dr. Barron asks what is the heinous crime the Federal Council committed. All they did was to pass a resolution that if (i) standards were maintained, (ii) students or their fathers had been at the war, (iii) other things being equal, then preference should be given to British born students. This is pure imagination by Dr. Barron. The Federal Council did nothing of the sort. It carried a resolution of absolute preference to Australian born students, excluding British and American born. He states that if it carried a resolution of exclusion there would be something to argue about. Let us not beat about the bush.

Melbourne's quota of medical students is 140 for 1944. It is not enough for those Australian born who desire to matriculate in medicine. Therefore the Federal Council's resolution is an "exclusion" resolution. Subtly worded, maybe, it means "stay out of our universities unless you are Australian born".

Dr. Barron has not heard my voice raised about the medical acts. If he means that if I were logical I should allow all doctors with foreign qualifications to practise here, he misses the point. I state unequivocally that, if a person of another country is allowed to come here, maintains our standards of living, obeys our laws and naturalizes, he is entitled to all that his brain and hands can give him. The medical acts in various States should be consolidated, and I yield to nobody in denunciation of some objectionable provisions. Medical men have been allowed to practise in Victoria with a poor Italian degree. That lowers our medical standard—that is, our way of life—and I have strenuously opposed their registration. On the other hand, a Viennese professor of neurology came to Victoria, was refused registration because of our act, went to another State and became registered. He then returned to Victoria, was still unregistered here, and when the new Federal National Emergency Regulations were introduced, became registered provisionally in this State. If Dr. Barron has not heard my voice in regard to this silly legislation, I regret that the River Murray divides us.

The Government is now calling for immigration; we are told by Sir W. Layton not to expect British born. If the profession is allowed by it to shut certain classes out of the intellectual pursuits, it will have to allow other vocations similar exclusion privileges.

If we are to be "little Australians", satisfied with ourselves, declining birth rate and all, let the Government state the restrictions when it issues the invitations to come here, and not introduce restrictions once our new Australians have established themselves.

I fail to recognize the argument about the ideal world. Great Britain has gained by the influx, at various times, of Danes, Normans, Huguenots and political refugees of all nations at all times. So why should not we?

Yours, etc.,
D. ROSEBY.

359, Church Street,
Richmond,
Victoria.
November 23, 1943.

DETERMINATION OF HÆMOGLOBIN IN BLOOD.

SIR: There are serious limitations to the use of artificial standards for the colorimetric determination of hæmoglobin in blood as oxyhæmoglobin. As Haldane[1] clearly stated in 1900: "The difficulty depends upon the fact that the visible spectra of oxy-hæmoglobin and the artificial colouring agents are not only different, but are not correspondingly affected by attenuation or by changes in the quality of the light."

In view of the somewhat unqualified commendation of a colorimetric method of this kind (Holden,[2] 1943) in "Current Comment" of this journal for November 13, 1943, a warning against the indiscriminate use of methods of this class is necessary.

In the hands of the experienced worker who will realize the necessity for using standard, fixed conditions of illumination, these methods can be convenient and accurate. But the statement that such a method is "particularly suitable for junior workers" cannot be accepted.

Although the use of suitable colour filters makes the colour of the standard very largely a matter of indifference, the requirements for the filter are critical. If these requirements are not fulfilled, and there is no indication that they have been fulfilled in the method discussed, comparatively slight variations of the intensity and/or quality of the light used may lead to serious errors.

Yours, etc.,
H. S. HALCRO WARDLAW.

Department of Biochemistry,
University of Sydney,
November 26, 1943.

THE TREATMENT OF BULLROUT LESIONS.

SIR: I have just read an excellent "Bulletin on Poisonous and Harmful Fishes" by G. P. Whitley, F.R.Z.S., issued by the Council for Scientific and Industrial Research. It contains much of interest to medical men. I noted that the treatment for bullrout lesions was given as similar to that for snake bite, potassium permanganate being stated as most efficient.

My colleague, Dr. M. Elliott, and I have over a number of years seen a considerable number of bullrout lesions, chiefly of the feet, the great toe being usually involved. The

[1] *The Journal of Physiology*, Volume XXVI, 1900-1901, page 497.
[2] *The Australian Journal of Experimental Biology and Medical Science*, Volume XXI, 1943, page 169.

punctures are usually single, but may occasionally be multiple. There is no doubt as to the intensity of the pain, coming on immediately it radiates along the limb to the groin (in the case of a foot), children often become almost maniacal and adults writhe in agony, collapse is sometimes severe. For many years we have injected hypodermically a solution of "Novocain" ("Adrocain") 1% in amounts of one to three cubic centimetres, if possible along the punctured wound. The effects have been immediate and dramatic, both local and radiating pain disappearing rapidly.

We are both of the opinion that the toxin is neurophile and we have never seen infection occur in the lesions.

Yours, etc.,

Park Street, Bellingen, New South Wales. November 29, 1943.

GEORGE H. HEWITT, M.B., Ch.M.

THE NERVOUS SOLDIER.

SIR: I wish to support Colonel A. G. Butler's "Caveat" against the quoted extract from the brochure of Professor Bostock and Dr. Evan Jones in the letter of Colonel Butler published in the journal of November 27. The quoted extract is basically wrong and the advice given therein is highly dangerous.

The Australian soldier, "officer and man", probably comprises the highest intellectual, moral and ethical citizens of Australia in their age groups, and such a statement as that of Professor Bostock and Dr. Evan Jones is a sad commentary on the people of this country and indicates a complete ignorance of psychology of the Australian soldier.

Yours, etc.,

Ballow Chambers, Wickham Terrace, Brisbane. November 29, 1943.

ERNEST CULPIN.

Australian Medical Board Proceedings.

QUEENSLAND.

THE undermentioned have been registered, pursuant to *The Medical Acts*, 1939 to 1940, of Queensland, as duly qualified medical practitioners:

Thams, George de Vleiger, M.B., B.S., 1943 (Univ. Queensland), General Hospital, Toowoomba.

Lilley, Ian Mitford, M.B., B.S., 1942 (Univ. Sydney), R.A.A.F.

Naval, Military and Air Force.

CASUALTIES.

ACCORDING to the casualty list received on December 6, 1943, Captain E. J. I. Watt, A.A.M.C., Launceston, who was previously reported missing, believed prisoner of war, is now reported prisoner of war.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Brown, Frederick Alan, M.B., 1942 (Univ. Sydney), Resident Medical Officer, State Hospital, Liverpool.

Books Received.

"Hermaphroditos: The Human Intersex", by A. P. Cawadias, O.B.E., M.D., F.R.C.P.; 1943. London: William Heinemann (Medical Books) Limited. 8½" × 5½", pp. 86, with illustrations. Price: 15s. net.

"Studies on Immunisation: First Series", by Sir Almroth E. Wright, M.D., F.R.S.; 1943. London: William Heinemann (Medical Books) Limited. 9¾" × 7½", pp. 433, with illustrations. Price: 25s. net.

"Chronic Pulmonary Disease in South Wales Coalminers: II. Environmental Studies"; Medical Research Council of the Privy Council, Special Report Series No. 244; 1943. London: His Majesty's Stationery Office. 9½" × 6", pp. 233, with illustrations. Price: 10s. 6d. net.

"Familial Nonreaginic Food-Allergy", by Arthur F. Coca, M.D.; 1943. Springfield: Charles C. Thomas. 8¾" × 5¾", pp. 167. Price, $3.00.

"Chest Examination: The Correlation of Physical and X-Ray Findings in Diseases of the Lung", by Richard R. Trail, M.C., M.A., M.D. (Aberdeen), F.R.C.P. (London), with a foreword by Sir Walter L. Langdon-Brown, M.A., M.D., F.R.C.P., D.Sc., LL.D.; 1943. London: J. and A. Churchill Limited. 8½" × 5½", pp. 117, with 47 illustrations. Price: 10s. 6d.

"Diseases of Infancy and Childhood", by Wilfred Sheldon, M.D. (London), F.R.C.P. (London), with a foreword by the late Sir Frederic Still, K.C.V.O., M.A., M.D., LL.D., F.R.C.P. Fourth Edition; 1943. London: J. and A. Churchill Limited. 9" × 5¼", pp. 758, with many illustrations. Price: 28s.

Diary for the Month.

DEC. 14.—New South Wales Branch, B.M.A.: Ethics Committee.
DEC. 14.—Tasmanian Branch, B.M.A.: Branch.
DEC. 17.—Queensland Branch, B.M.A.: Council.
DEC. 21.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

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